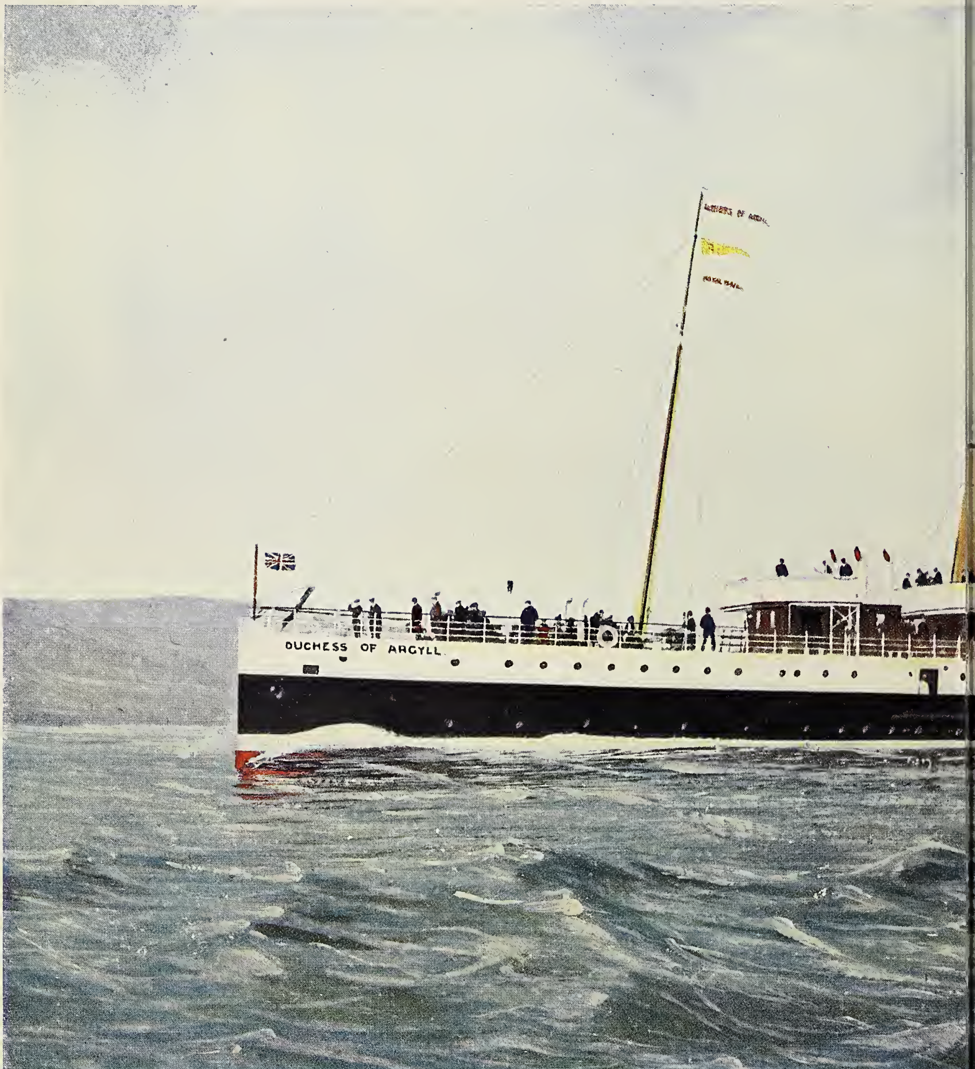
GIFT OF
THOMAS NORRELL
DIVISION OF TRANSPORTATION
CAT. No. 326,990 ASS. No. 266,009

Presented with "THE RAILWAY AND TRAVEL MONTHL



CALEDONIAN STEA

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TURBINE SCREW STEAME

Length, 250 feet; Breadth, 30 feet; Depth, 10 feet 6 i
Passenger

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PACKET CO., LTD.

RAILWAY).

“DUCHESS OF ARGYLL.”

es; 3,600 Indicated Horse Power; Speed, 21¾ knots;
acity, 1,713.

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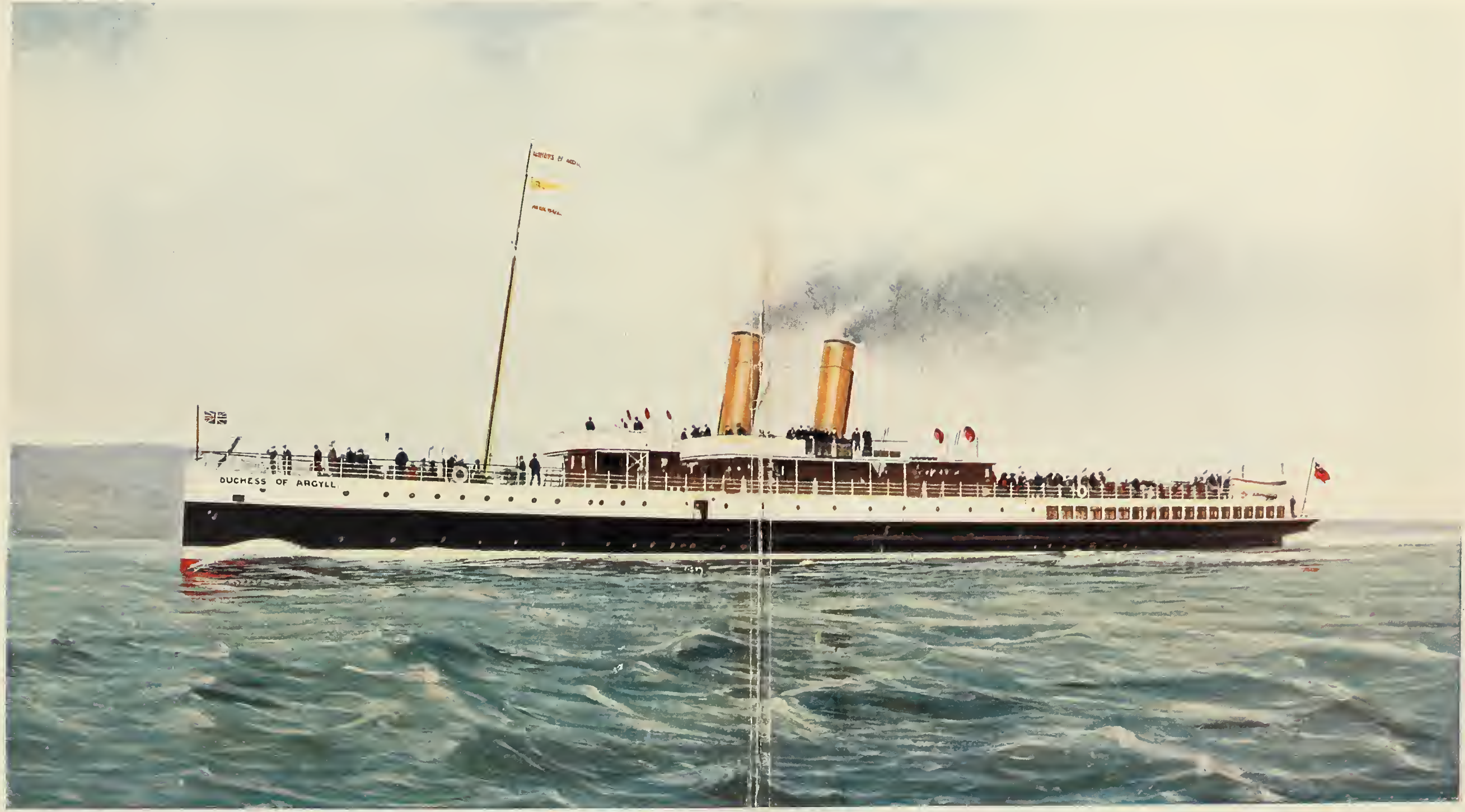
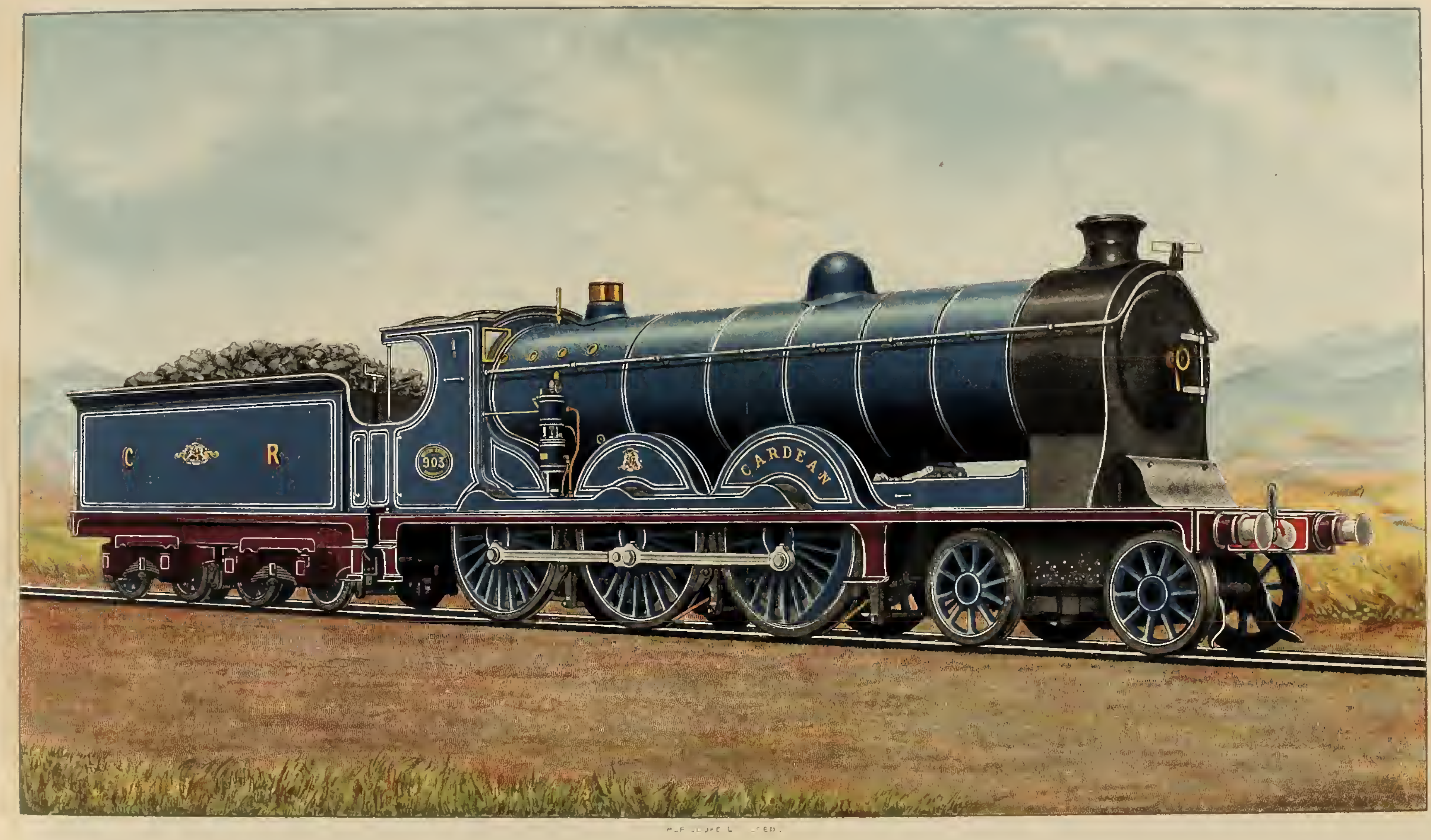


CALEDONIAN STEAM PACKET CO., LTD.
(CALEDONIAN RAILWAY).

TURBINE SCREW STEAMER "DUCHESS OF ARGYLL."

Length, 250 feet; Breadth, 30 feet; Depth, 10 feet 6 inches; 3,600 Indicated Horse Power; Speed, 21¾ knots; Passenger Capacity, 1,713.

THE "CHARING CROSS" OF THE HIGHLANDS.
OBAN: CALEDONIAN RAILWAY.



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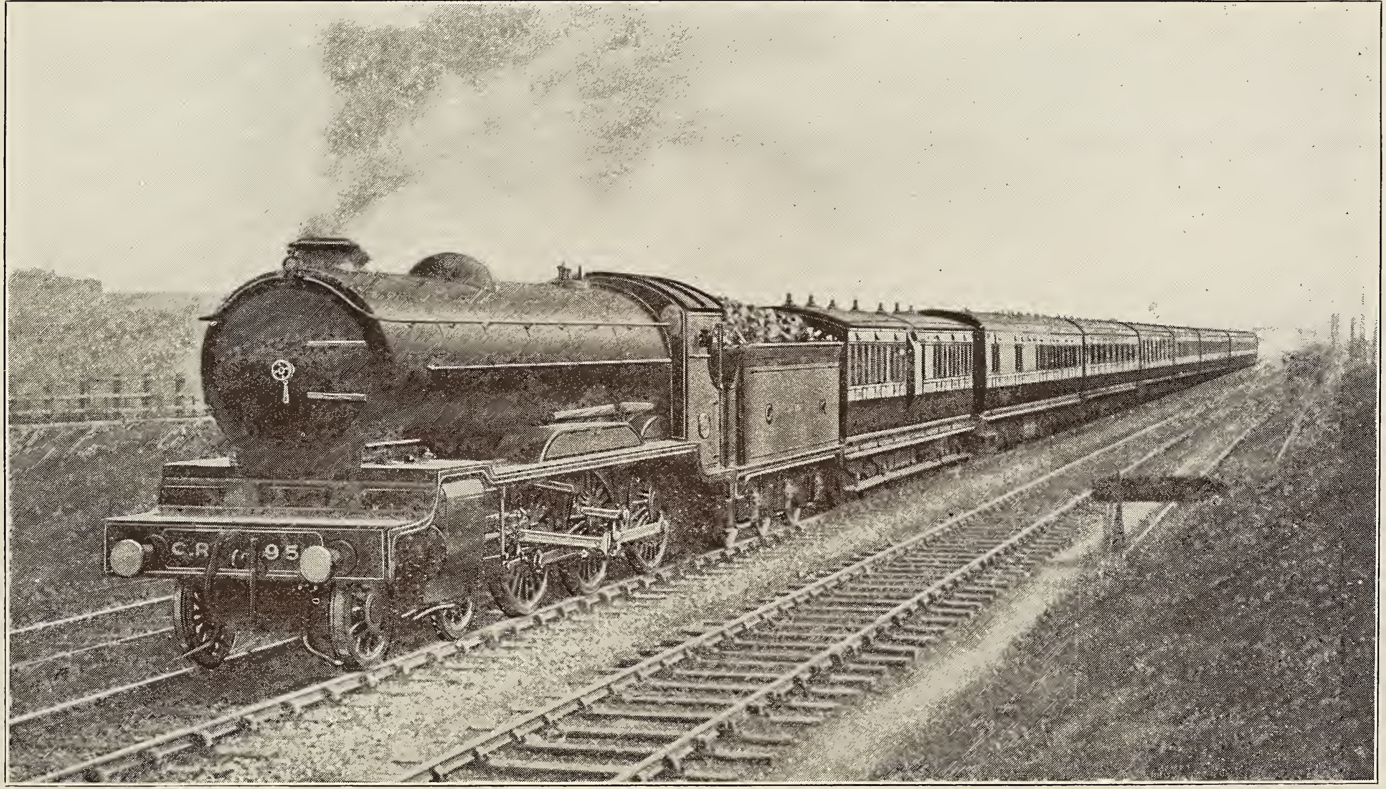
Caledonian Railway Express Locomotive, No. 903, "Cardean."

Designed by Mr. J. F. McIntosh, Chief Mechanical Engineer, and Built at the Company's Works St. Rollox.
Driving Wheels: Diameter, 6ft. 6in Cylinders: Diameter 20in. Stroke, 26in. Heating Surface: 2,400 sq. ft. Grate Area: 26 sq. ft.
Boiler Pressure: 200lbs. per sq. in. Weight on Coupled Wheels: 54 tons 10 cwts.
Tender: Water Capacity. 5,000 galls. Coal Capacity, 6 tons.
Engine: In Working Order, 73 tons. Tender: In Working Order, 57 tons.
Total Weight of Engine and Tender in Working Order. 130 tons.



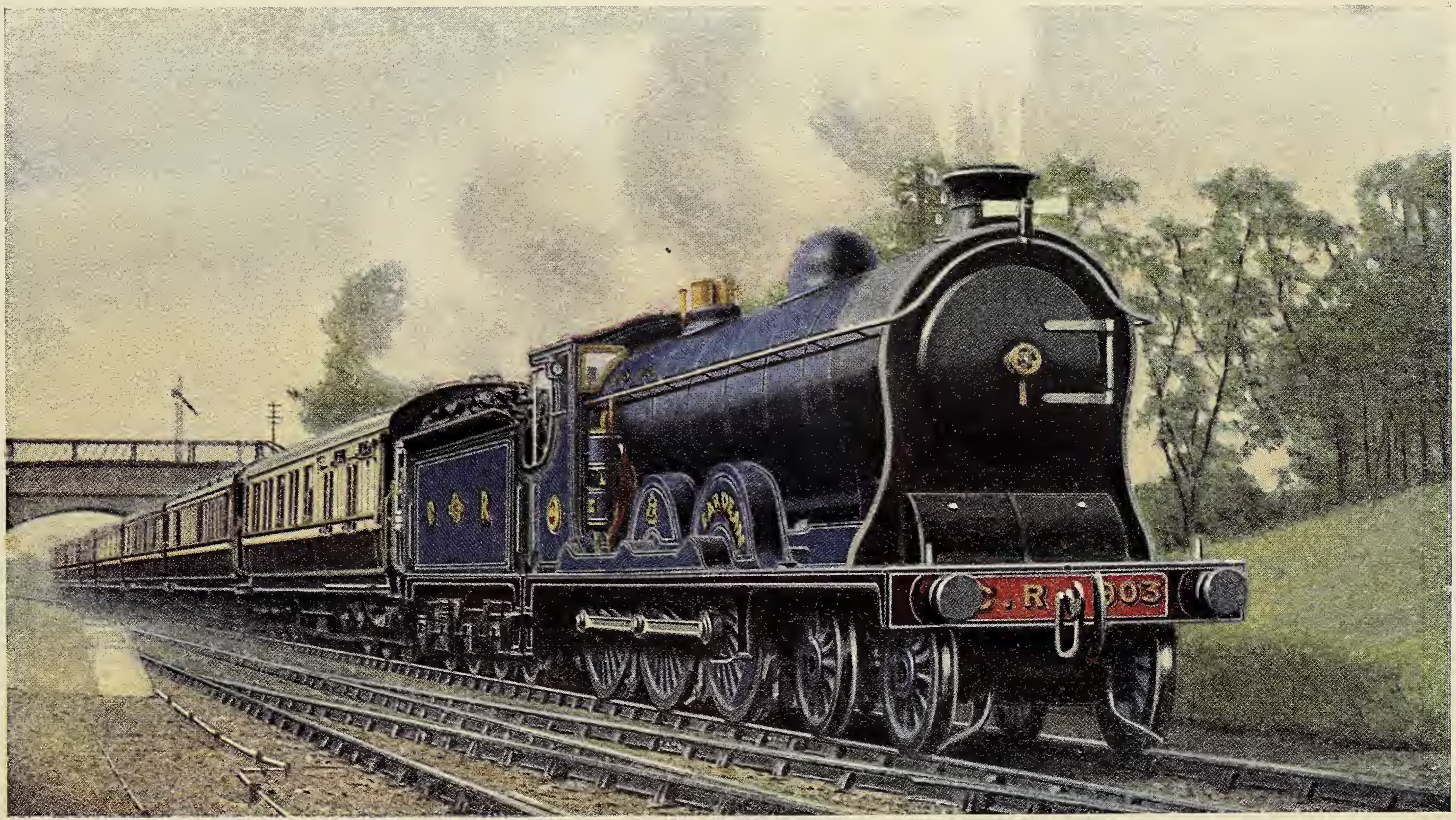
THE RAILWAY MAGAZINE.]

GLASGOW-ABERDEEN RESTAURANT CAR EXPRESS, CALEDONIAN RAILWAY.

5 P.M. EX BUCHANAN STREET, NEAR GLENBOIG.

PICKERSGILL THREE-CYLINDER SUPERHEATER 4-6-0 LOCOMOTIVE No. 956.

(From a Photograph by Henry L. Salmon.)



(From a photograph by F. E. Mackay)

2 p.m. GLASGOW—LONDON RESTAURANT CAR EXPRESS.

Caledonian and London and North Western Railways.

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GIFT OF
THOMAS NORRELL
DIVISION OF TRANSPORTATION
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THE RAILWAY MAGAZINE.

SEPTEMBER, 1907.

[Articles and clippings relating to British railways]

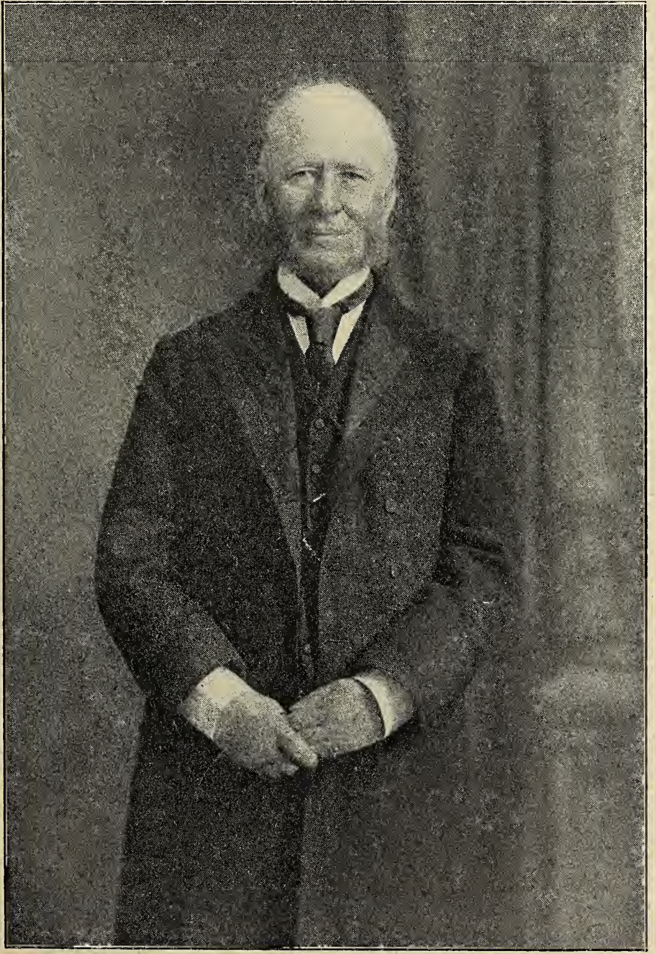
The Caledonian Railway's Diamond Jubilee.

ILLUSTRATED INTERVIEW WITH MR. ROBERT MILLAR, GENERAL MANAGER.

"SUCH important an event as a Diamond Jubilee offers so exceptional an opportunity of learning something concerning the always-to-the-fore Caledonian Railway, that Mr. Millar, I am asking you to give RAILWAY MAGAZINE readers some particulars concerning the railway which has absorbed some of the earliest railways in the kingdom."

"The directors and officers of the Caledonian Railway take a permissible pride in the position the Company occupies amongst the railway systems of the United Kingdom, and the Diamond Jubilee of the opening of the first portion of our railway—from Carlisle to Beattock—presents a fitting occasion to review the progress achieved in the past. The RAILWAY MAGAZINE for June last* described the initiation and early history of the Caledonian Railway, so I assume your readers will need no information concerning earlier events."

"That is so, Mr. Millar; it is generally known that the Caledonian Railway forms the northern portion of that system of communication between Scotland and England, called



Photo] [*Barclay Bros., Glasgow.*

SIR JAMES KING, BART., CHAIRMAN CALEDONIAN RAILWAY.

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* "The Genesis and Growth of the Caledonian Railway," page 441, Vol. XX.

by some 'The West Coast Route,' and by others 'The Royal Mail Route.'

"There are, however, certain points on which uncertainty exists; for instance—How did the West Coast route obtain so important a share of the traffic between England and Scotland?"

"Well, I presume, one of the reasons at all events is that we were first in the field. The original line of the Caledonian Railway gave that Company access to Edinburgh and also to Glasgow, and having made a junction with the Scottish Central Railway at Greenhill, we also got through that Company, and by means of the Scottish Midland Junction and Aberdeen Railways (afterwards the Scottish North-Eastern Railway), a through route to Perth, Dundee, Aberdeen and other places in the North of Scotland.

"Not only did the Caledonian Railway have the earliest route to the places named, but for many years it had the only 'all-land' route to the North of Scotland—its competitors having had to resort to the use of ferries—across the Forth between Granton and Burnt Island, and across the Tay between Tay Port and Broughty Ferry, near Dundee.

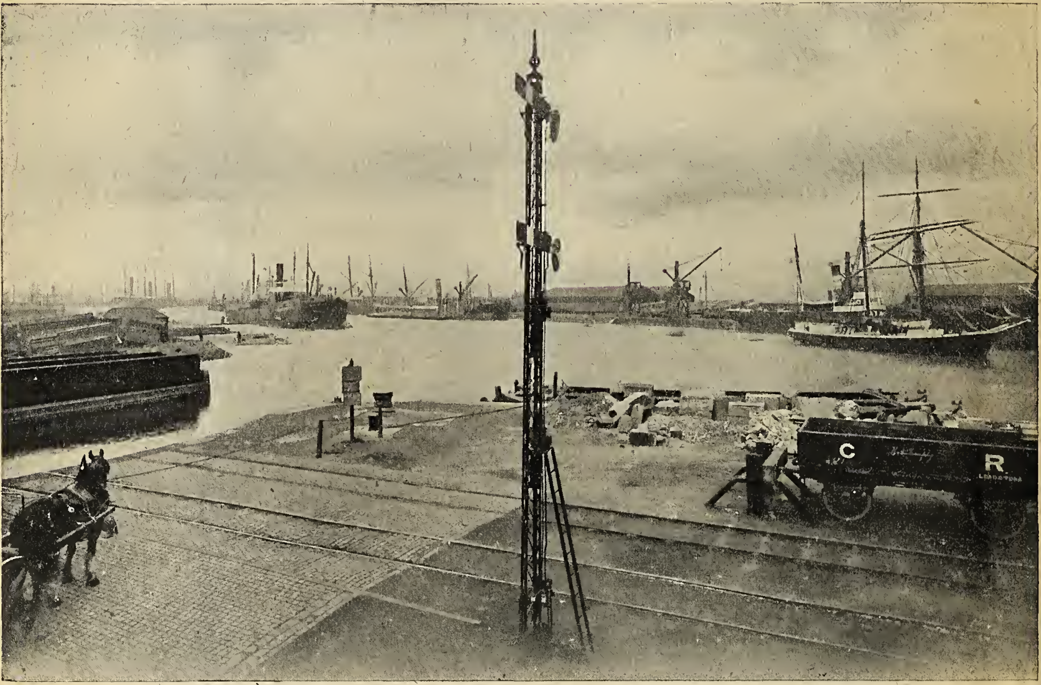
"This also doubtless led to the Caledonian Railway getting hold of a share of the traffic referred to, and the amalgamations of 1865 and 1866 strengthened its hold."

"What about your communication between Edinburgh and Glasgow?"

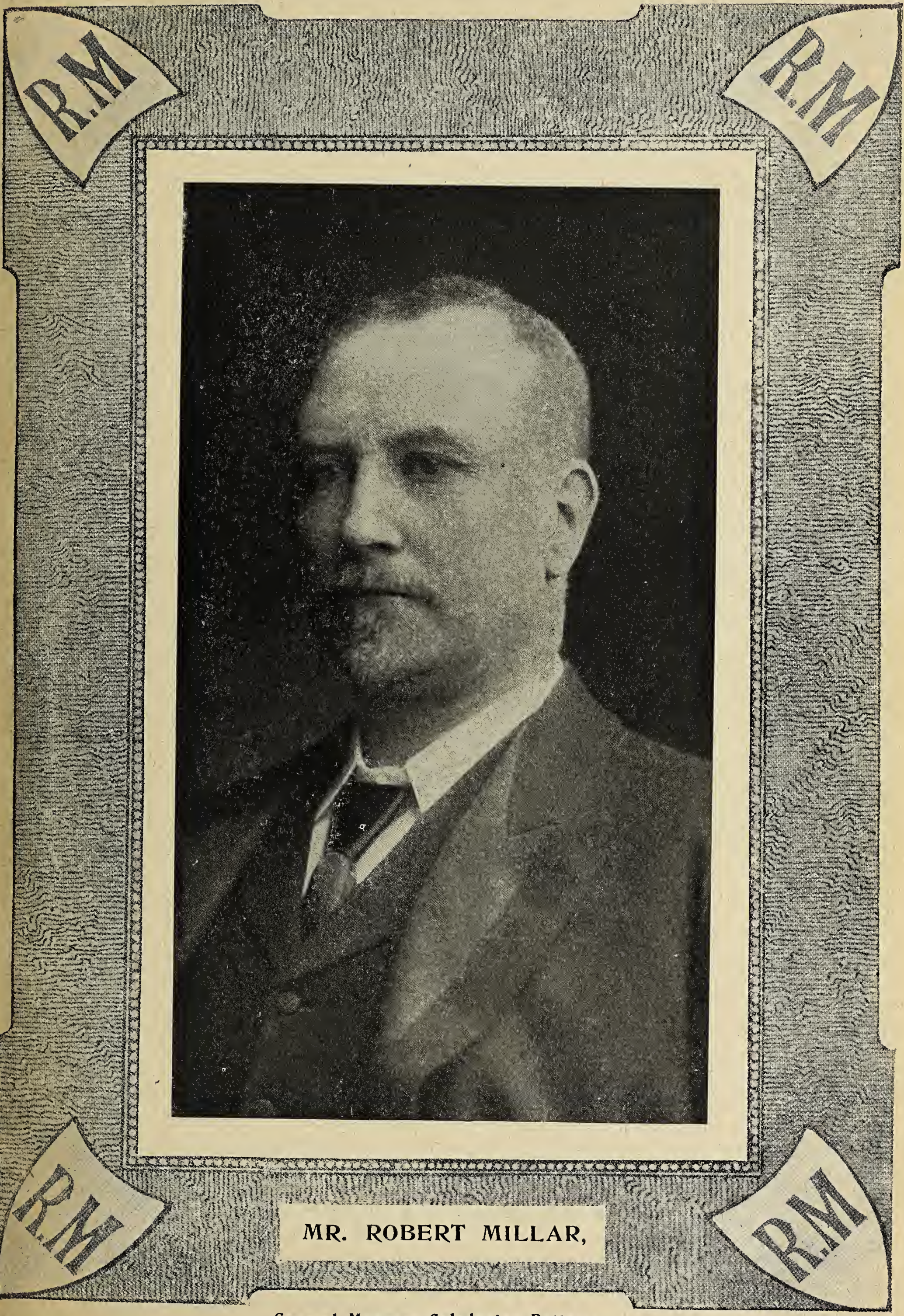
"The Caledonian Line from Carlisle to Edinburgh and Glasgow was opened in February, 1848, and having obtained access to the official and also to the commercial capitals of Scotland, the railway naturally sought to improve its means of communication between the two. This was successfully accomplished by the opening of the Cleland and Midcalder Railway in 1869, which gave the Caledonian Railway its existing short route between Edinburgh and Glasgow.

"Prior to the opening of the Cleland and Midcalder Railway, the Caledonian Railway's only route between Glasgow and Edinburgh was *via* Carstairs, a distance of 58 miles, against the Edinburgh and Glasgow Railway's route of 47 miles.

"The opening of the Cleland and Midcalder line reduced the distance to 46 miles, and no one need be told that such a shortening of the route enabled the



THE CARRON DOCK, GRANGEMOUTH.



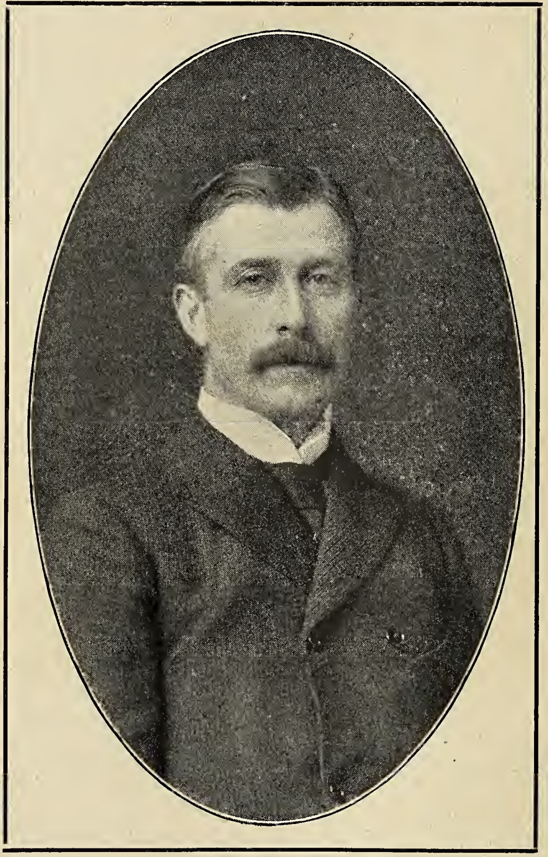
MR. ROBERT MILLAR,

General Manager Caledonian Railway.

Caledonian Railway to compete successfully with its rivals, and materially added to the Caledonian Railway's traffic between the Eastern and Western cities."

"When does the expansion policy of the Caledonian Railway date from ?"

"The expansion policy, as you are pleased to call it, dated back to the inception of the line, for at that time a big scheme of extension was foreshadowed, but what have come to be known as the Amalgamation years of the Caledonian Railway were the years 1865, 1866, and 1867.



MR. JNO. BLACKBURN,
SECRETARY CALEDONIAN RAILWAY.

"Prior to the year 1865, the Northern termination of the Caledonian Railway was at Greenhill, about four miles south-west of Falkirk, where it joined the line of the Scottish Central Railway.

"In that year the Caledonian Railway took over the Scottish Central Railway system, and thus became owner of the railways to Perth, Dundee, and Newtyle, with branches to Denny, South Alloa, Callander, and Crieff.

"In the same year it also took over the line from Lockerbie, *via* Lochmaben, to Dumfries, and the General Terminus Railway, giving access to the south side of Glasgow Harbour.

"In the following year the Caledonian Railway took over the undertaking of the Scottish North-Eastern Railway (itself an amalgamation of the Scottish Midland, Junction, and Aberdeen Railways), extending from Perth and Dundee to Aberdeen with branches to Methven, Blairgowrie, Alyth, Kirriemuir, Arbroath, Brechin, and Montrose.

"The Caledonian Railway thus became the owner of the line from Carlisle to Dundee, Perth, and Aberdeen.

"The absorptions of railways by the Caledonian Railway have been numerous, reaching a total of thirty-seven.

"Amongst the absorptions have been the following railways :—Alloa, Arbroath and Forfar, Busby, Crieff and Comrie, Clydesdale Junction, Dumfries, Lochmaben, and Lockerbie, Forth and Clyde Navigation, General Terminus (Glasgow), Glasgow, Garnkirk and Coatbridge, Greenock, Greenock and Wemyss Bay, Hamilton and Strathaven, Lesmahagow, Lochearnhead, St. Fillans, and Comrie, Paisley and Barrhead, Moffat, Pollock and Govan, Solway Junction, Symington, Biggar, Broughton, and Peebles, Scottish Central, Scottish North-Eastern, Wishaw and Coltness.

"The length of line owned by the Caledonian Railway at the commencement of 1865, was only 230 miles; at the end of 1867 it had increased to 574 miles."

"Did this large increase in the mileage of the railway satisfy the directors ?"

"Probably it did, for the time; but the Caledonian Railway had not got, and these amalgamations did not provide it with, a port on the east coast of Scotland suitable and convenient for the shipment of coal to the Continent, and elsewhere, from the Lanarkshire coalfields which it served.

"The directors and officers of the railway accordingly turned their attention to getting such a port where they could control shipping arrangements, and their choice fell on Grangemouth.

"Grangemouth, at that time, consisted of a tidal harbour and two small docks of between seven and eight acres in extent, and was owned by the proprietors of the Forth and Clyde Navigation. In addition to the port of Grangemouth, the Navigation Company was also the proprietor of the Forth and Clyde Canal, extending from Grangemouth to Glasgow and Bowling, on the Clyde, the Monkland Canal, from Glasgow to Woodhall, near Airdrie, the Grangemouth Branch Railway, from Grahamstown to Grangemouth, the Drumpeller Railway, near Coatbridge, and the Harbour of Bowling.

"As the Harbour of Grangemouth could not be purchased without the other parts of the undertaking, the Caledonian Railway became the proprietor of the whole in 1867."

"What you have just said accounts for the Caledonian Railway being a canal proprietor, and also shows that it became so without any ambition in that direction, but rather by the force of circumstances.

"Apart from the amalgamations, etc., you have mentioned, did the Caledonian Railway make any other forward movement about that time?"

"The year 1865 also marked the opening of the Greenock and Wemyss Bay Line and pier.

"The line extended from Port Glasgow on the Greenock Railway, to Wemyss Bay, on the Firth of Clyde, on the boundaries of the counties of Renfrew and Ayr.

"The new railway formed the shortest route between Glasgow and places on the lower reaches of the Firth of Clyde, such as Largs, Millport, Innellan, Toward, Rothesay, Colintraive, Tighnabruaich, Tarbert, Ardrishaig, Inveraray, etc.

"Prior to the opening of the railway and pier, the great bulk of the passenger traffic for the places above named travelled *via* Greenock. The opening of the Wemyss Bay Line revolutionized this traffic.

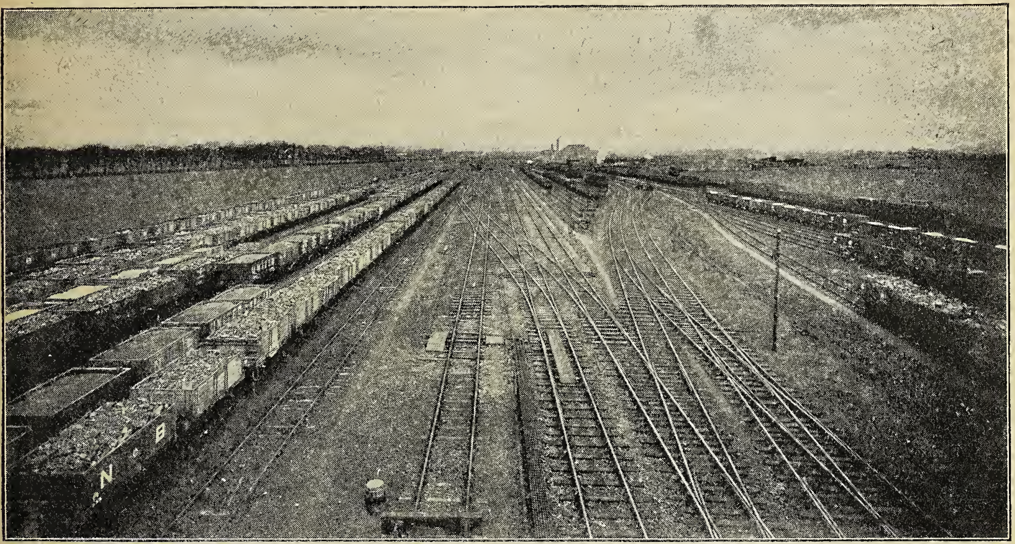
"At the opening of the Wemyss Bay Line, in 1865, the Caledonian Railway was (apart from private owners of steamers) the only railway carrying passengers for places on the Clyde.

"From the Old Quay, Greenock boats, in connection with the Caledonian's trains, departed, carrying passengers chiefly for the upper reaches, while from Wemyss Bay those for the lower reaches were carried.

"But, of course, this state of matters was not allowed to continue very long.

"The Greenock and Ayrshire Railway Company, in 1865, got authority to construct a railway from Greenock to Johnstone, with a branch towards Glasgow. They also got power to make a station at Princes Pier, Greenock, on the bank of the river.

"The railway and station (now a part of the Glasgow and South-Western Railway) were opened for traffic in December, 1869, and from



FOULDUB'S MARSHALLING YARD, GRANGEMOUTH.

that date the Caledonian Railway's traffic for the coast, *via* the old steamboat quay at Greenock, began to diminish, the Caledonian Railway station at Greenock being several hundred yards from the quay, and the only route between the two being by means of a rather insalubrious lane.

"The Caledonian Railway naturally made strenuous efforts to retain the traffic, but they were of little effect.

"The old route, with its inconvenient transference between railway and steamboat, could not compete with the newer and more convenient route, *via* Princes Pier.

"The Caledonian Railway had, therefore, to 'grin and bear' this loss of traffic."

"I expect that was not for long, Mr. Millar; the directors and officers of the Caledonian Railway have the reputation of not being satisfied with the position of second place?"

THE ORIGINAL PIER AT WEMYSS BAY PRIOR TO THE CONSTRUCTION OF THE RAILWAY.

"Unfortunately, they had to do so till the new route to Gourock was opened, which put a different aspect on matters. This line was authorised in 1884 and opened on 1st June, 1889, and the traffic which the Caledonian Railway formerly carried on by the old steamboat quay at Greenock, now returned in increased volume to it *via* Gourock, so that now it can be said that by far the larger proportion of coast traffic is again being carried by the Caledonian Railway, either *via* Gourock or *via* Wemyss Bay.

"While on the subject of 'coast' traffic, it may as well be stated that the opening of the Lanarkshire and Ayrshire Railway (a railway worked and managed by the Caledonian Railway) to Ardrossan Pier, in May, 1890, had a considerable effect on the traffic to the Island of Arran, to Belfast, the Isle of Man, etc.

"Up to that time the traffic to and from these places, *via* Ardrossan, was served solely by the Glasgow and South-Western Railway. Now both the Caledonian Railway and South Western Railway share in the carrying. The traffic has been largely increased, no doubt, through the increased facilities which have been given.

"These facilities consisted of a first-class service of trains by the new railway; and a new pier at Ardrossan Harbour, upon which was built a new railway station.

"Steamers in connection with Caledonian trains arrive at and depart from this pier, and the trains run practically alongside the steamers, so that every possible convenience exists for the prompt change from train to steamer, or *vice versa*."

"The Caledonian Railway's underground line across Glasgow was, I assume, constructed for the purpose of providing better facilities for urban transit?"

"That is so. The Glasgow Central Railway, which was authorised in 1888, and opened in sections between 1894 and 1896, extends from Dalmarnock, in the East end of Glasgow, to Maryhill and Dawsholm in the North-West district of Glasgow. It is chiefly underground, running beneath some of the principal streets of Glasgow. On its route it has stations at Glasgow Green, Glasgow Cross, Glasgow Central, Anderston Cross, Stobcross (for Queen's Dock), Kelvinbridge (for the University and Kelvingrove Park), Botanic Gardens, Kirklee, Dawsholm, and Maryhill.

"The line, which is about six miles in length, was a very costly one, but it enabled the Caledonian Railway to get access to

Queen's Dock, and so share in the large traffic dealt with there.

"Before the construction of the Glasgow Central line the Caledonian Railway's only access to the Queen's Dock was by means of the circuitous route of the North British Railway from Sighthill East Junction. For the use of the North British Railway's line the Caledonian Railway had to pay rather a 'stiff' toll.

"The line was intended to be beneficial as regards passenger traffic, and no doubt this expectation would have been fully realised but for the fact that the conversion of the Glasgow Tramways from horse to electric traction has diverted a great deal of short distance traffic from the railway to the tramways."

"The extension of the Caledonian Railway along the north bank of the Clyde is one of the important modern developments of the system?"

"The building of the Glasgow Central Railway rendered possible the construction of a line, the want of which had been very much felt for a considerable time, viz., a railway from Glasgow to Dumbarton and Loch Lomond.

"In 1891 the principal ironmasters, coalmasters, and steelmakers in Lanarkshire, and the shipbuilders, engineers, and other large employers of labour on the north bank of the Clyde between Glasgow and Dumbarton, and the Turkey red dyers in the Vale of Leven, banded themselves together and got authority from Parliament to make the Lanarkshire and Dumbartonshire Railway.

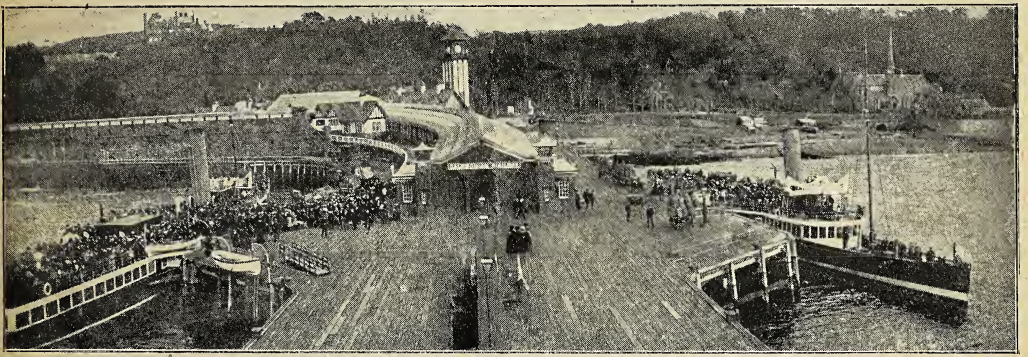
"The railway, as promoted, began with a junction with the Glasgow Central Railway at Stobcross, Glasgow, and ran closely along the north bank of the Clyde to Dumbarton, where it turned up the Vale of Leven, and terminated at Aber Bay, on the south shore of Loch Lomond.

"The railway between Glasgow and Dumbarton was passed after a very protracted struggle before Parliament, but the portion between Dumbarton and Loch Lomond was rejected. A working agreement had been made with the Caledonian Railway, who agreed to subscribe half the capital and to guarantee a dividend of 4 per cent.

"The rejection of the Loch Lomond part of the scheme did not please the promoters, and in the following Session they deposited a Bill for authority to make the portion which had been rejected.

"Before any proceedings took place on the Bill negotiations were entered into between the North British, Caledonian, and Lanarkshire and Dumbartonshire Railway Companies with the view of coming to an arrangement whereby the duplication of lines in the Vale of Leven might be avoided. These negotiations ended in an arrangement whereby the Lanarkshire and Dumbartonshire Railway Company was to make a junction with the North British Railway at Dumbarton; the North British Railway, from the junction of the Lanarkshire and Dumbartonshire Line to Balloch at the foot of Loch Lomond, was to become the joint property of the North British Railway, the Caledonian Railway, and the Lanarkshire and Dumbartonshire Railway, and the steamers on Loch Lomond were also to become the joint property of those Companies. That arrangement was given effect to by Parliament by the passing of the Dumbarton and Balloch Joint Line Act, 1892.

"The Lanarkshire and Dumbartonshire Railway was opened, and the Dumbarton and Balloch Line and steamers vested



THE PRESENT PIER AND RAILWAY STATION AT WEMYSS BAY.

in the three Companies, on October 1st, 1896.

"The opening of the Lanarkshire and Dumbartonshire Railway has proved of enormous advantage to the district through which it runs. Since its opening works, which formerly were few, have now been established all along its route, till there is little land left for other works between Partick and Bowling.

"Into almost every work along the north bank of the Clyde, whether established before or since the opening of the railway, there is siding connection with the Lanarkshire and Dumbartonshire Railway, and only a month or two ago a connection was made from it to the new Rothesay Dock of the Clyde Trustees at Clydebank, which was recently opened by the Princess of Wales.

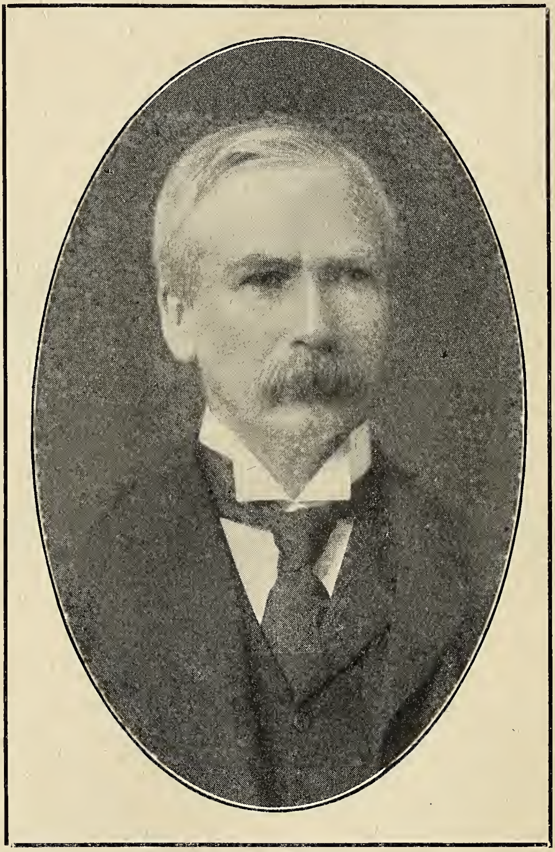
"The tourist traffic on Loch Lomond has also very largely increased since the Caledonian Railway acquired an interest in the route. Since 1892 two new steamers have been added by the Joint Companies to the Loch Lomond fleet.

"The construction of the Central and Lanarkshire and Dumbartonshire Railways, the acquisition of a share in the Joint Line, and also a share in the ownership of the steamers on Loch Lomond, have, consequently, opened up a new district to the Caledonian Railway and to the millions of passengers using its line, not to speak of the enlarged area now open to coalmasters, steelmakers, and other kindred trades in Scotland, chiefly served by the Caledonian Railway."

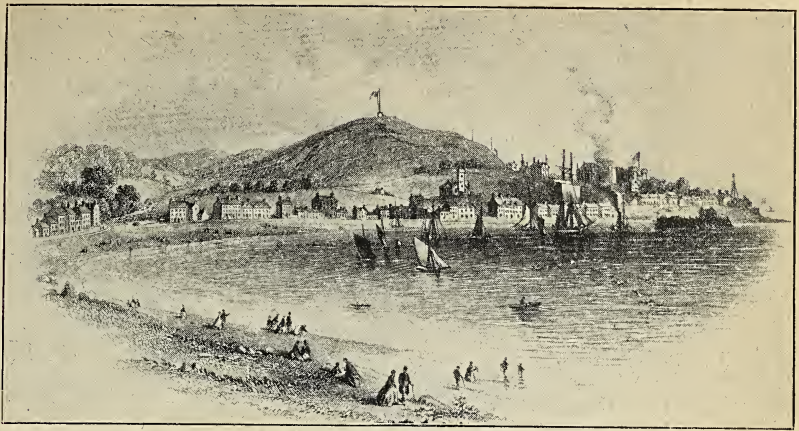
"From what you have just told me, Mr. Millar, it is evident that the introduction of the Caledonian Railway to the Dumbarton and Vale of Leven districts has been of great benefit to that part of Scotland. I suppose other parts of North Britain have been favoured in a somewhat similar manner by the Caledonian Railway?"

"I am afraid we must plead guilty to the impeachment. Take the case of Aberdeen, where, as is well known, we connect with the Great North of Scotland Railway. Up to the year 1867, the only connection between the two railways was by the use of rails laid along the quays from our station in Guild Street to the Waterloo station of the Great North of Scotland Railway, in a different part of the 'granite city.' This connection applied only to goods; passengers (to use a railway expression) had 'to find their own way' between the two stations.

"Recognising the inconvenience of such a connection, and its unfitness for a rapidly-increasing traffic, the Scottish North-Eastern Railway (the predecessors in that part of the country of the Caledonian Railway) applied to Parliament, in 1864, and got authority to construct the Denburn Valley Railway, extending from Denburn Junction on the Scottish North-Eastern Line to Kittybrewster on the Great North of Scotland Line, with a passenger station thereon. The line and station were to be constructed at the joint expense of the Scottish North-Eastern and Great North of Scotland Railways, and were to become the property of these two Companies jointly. The line and station were constructed and opened in 1867


MR. H. B. NEAVE,
SOLICITOR CALEDONIAN RAILWAY.

the year after the Caledonian Railway took over the Scottish North-Eastern Line, and no difficulty now exists either in regard to the exchange of passengers or vehicles of any kind at Aberdeen.


GOUROCK PRIOR TO THE ADVENT OF THE CALEDONIAN RAILWAY.

"So much has the traffic grown at Aberdeen stations (both goods and passenger) that the approach lines have been found insufficient to deal with it.

"Consequently, the Caledonian Railway has had to quadruple the lines between Ferryhill Junction and Aberdeen, re-arrange its goods station, lay down a considerable number of sidings at Craiginches immediately south of Aberdeen, and execute other works in connection therewith. As you know, Mr. Sekon, we have to provide accommodation for the North British Railway at Aberdeen, which has no independent access, but travels over the Caledonian Railway from Kinnaber Junction, 38 miles south of Aberdeen. The Great North of Scotland Railway is also re-arranging its goods station and laying down new sidings, while the two Companies are at present jointly engaged in the construction of a much enlarged and improved passenger station at Aberdeen."

"The Caledonian Railway has also developed the western and north-western parts of Scotland ?"

"Certainly ; mention may be made of the Callander and Oban Railway as an instance of what the Caledonian Railway has done to open up the country, and particularly the Western Highlands and Islands.

"Although the Callander and Oban Railway is technically an independent company, it has always been worked, managed, and maintained by the Caledonian Railway, which holds a large proportion ot its capital,

"Authorised in 1865 from Callander to Oban, it was opened to Tyndrum in 1873; the portion of the line from Tyndrum to Oban having been abandoned in 1870.

"The cause of the abandonment was much the same as had led to the abandonment of many other lines, viz. :—want of cash. The Caledonian Railway having come to the

GOUROCK PIER AND RAILWAY STATION IN 1907.

rescue, arrangements were made for continuing the line to Oban in substitution for the abandoned portion, and this extension was authorised in 1874.

"In 1878 an extension of the line to Oban Bay, with a pier and sea wall, was authorised.

"The whole works were completed and opened for traffic on 1st July, 1880. The total length of the line from Callander to Oban is nearly 72 miles.

"The line passes through a most picturesque but very sparsely populated district, and the traffic on it, except for a few months in the summer, is not a heavy one."

"You have no doubt that the construction of the line to Oban has been of benefit to that part of Scotland?"

"While the line has not yielded that return which those who invested their money in it expected, there can be no doubt as to the benefit it has conferred on the district which it serves, and to the Western Islands beyond. It has promoted a tourist traffic which could not otherwise have been developed, and it has considerably increased the value of the fishing industry in the western seas.

"Lines of steamers run from and to all parts of the western Highlands, and leave and arrive at Oban daily during the season in connection with trains.

"In 1897 the Callander and Oban Railway obtained powers to considerably enlarge the station at Oban, and also to extend the quay and sea wall there, so as to afford accommodation for the increased number of steamers then plying to and from Oban in connection with the trains. It also obtained powers to construct a railway from the line at Connel Ferry, near Oban, to Ballachulish, on the shores of Loch Leven, with a pier on that loch. The length of line is about twenty-eight miles.

"The railway crosses two arms of the sea, Loch Etive, at Connel Ferry, and Loch Creran, at Cregan. The bridge over Loch Etive is 1,044 ft. in length, built on the cantilever principle, and has a clear headway of 50 ft. above high water level, having one span of 500 ft. in length, which is only exceeded in this country by the spans of the Forth Bridge. The whole works, which were very costly, were opened for traffic in August, 1903."

MR. A. BRAND,
CHIEF ASSISTANT TO THE GENERAL MANAGER.

"Mention of the Forth Bridge reminds me that the Caledonian Railway also possesses a Forth Bridge."

"Our Forth Bridge may be accepted as a proof that the Caledonian Railway has always been looking ahead of the times. The bridge gave us access to the town of Alloa.

"When the Caledonian Railway acquired the Scottish Central Railway in 1865, we became the proprietors of the small harbour of South Alloa, on the River Forth, but had no rail connection with the important town of Alloa on the opposite bank of the river. Half-a-mile of navigable water separated the railway from the town.

"In 1879 authority was obtained from Parliament by a number of local gentlemen, who were incorporated under the name of the Alloa Railway Company, to construct a railway from the Caledonian Railway's South Alloa Branch, at Dunmore Junction, crossing the River Forth on a viaduct, having two opening spans, to the town of Alloa.

"The viaduct is 1,704 ft. in length, and its two opening spans have each a width of 60 ft. These enable vessels to pass through the viaduct with their masts standing.

"The railway was made and opened on 1st October, 1885, from which date the Caledonian Railway ceased to run passenger trains to South Alloa or to work the ferry which it had established between South Alloa and North Alloa.

"The North British Railway, in order to save the *detour* by Stirling for Alloa traffic, and also to enable it to compete with the new line, deposited a Bill for a scheme to cross the river a short distance above the new line.

"Negotiations led to a settlement satisfactory to all parties. The Caledonian Railway gave the North British Railway running powers over the Alloa Railway, and undertook to double a portion of the Alloa Branch Railway between the Caledonian Railway's main line and Dunmore Junction, where the Alloa Railway began. The Caledonian Railway, on the other hand, got access to the North British Railway's passenger station at Alloa, and the North British Railway undertook to send a certain minimum traffic over the bridge each year, or to make up what the minimum would have yielded."

"The instances of joint lines and other facilities you have mentioned, Mr. Millar, show that the Scotch railways already work in unison at several places.

"Doubtless you could name other places where the Caledonian Railway has done a good deal towards developing the trading and travelling facilities of the district?"

"Numerous other instances could be given of the general nature of the extensions and improvements of the Caledonian Railway, such as Leith, but I need not trouble you with more."

"It is generally admitted, Mr. Millar, that the Caledonian Railway has proved itself an important factor in developing the resources of Scotland and opening up remote parts of the country. RAILWAY MAGAZINE readers are much interested in your views as to the present and future prospects of not only the Caledonian, but of British railways generally."

"He will be a bold, not to say a rash, man who will forecast the future of the Caledonian Railway, or, indeed, of any other railway in the United Kingdom, if he bears in mind the tendencies of the age.

"For some years past legislation has dealt very harshly with the interests of railway shareholders, everything has had to give place to, what are supposed to be, the interests of labour. Whether this tendency has at length run its course, and a more

CALEDONIAN RAILWAY TRAIN AT BALLOCH PIER, WITH LOCH LOMOND STEAMER *Prince George* ALONGSIDE PIER.

enlightened view will now be taken in regard to the real interests, not only of shareholders, but also of the workers and of the country generally, remains to be seen. Unless such a recognition takes place very soon, shareholders will cease to invest their moneys in railway stocks, as they will then know that such investments will not receive any protection from Parliament, if, in the opinion of Parliament, it is necessary to pander to other interests at the expense of the railways.

"In forecasting the prospects of any railway company, several matters must be kept in view, and allowance made for them, such as :—

(*a*) The shortening of railwaymen's hours of labour.

(*b*) The increasing demand for higher wages on part of the railway servants.

(*c*) The possible further requirements in regard to automatic couplings, either-side brakes, provision of lines for the abolition of tail roping at places, where there is a very small traffic, etc.

(*d*) Increased expenditure under the Workmen's Compensation, Employers' Liability, and other Acts of Parliament.

(*e*) Increase in local taxation.

(*f*) Competition by municipal tramways and liability to contribute to any loss sustained through the working of such tramways.

(*g*) Increased cost of materials (and specially coal) used by railway companies, and, finally, statutory restriction on railway companies against raising their rates to meet increased cost."

CONNEL FERRY CANTILEVER BRIDGE, LOOKING NORTH.
Span 500 feet. Height of floor above high water, 50 feet.

"You have given a very formidable list of matters likely to prejudice the success of railways. Your final one raises a most important point. If wheat appreciates in value, the baker raises the price of bread ; if palm oil is scarce, soap is dear ; a shortage of cotton and wool causes our clothes to be more expensive. Why, then, if the cost of railway operation be increased, because the 'raw materials' (coal, labour, iron, steel, etc.) of railway working are dearer, should not railway companies be able to act in the same manner as other trades, and raise the price of the commodity they deal in—that is 'transport ?' "

" I wish we could make our critics see the point as you put it, Mr. Sekon.

" It may be said that railways can increase their rates provided they can show that such increases are reasonable, but all railways know through sad experience what this means, viz. :—that such a thing under the existing law is impossible.

" Railways are not allowed to conduct their business on commercial principles. All other trades raise their prices to meet increased cost of production. Railways are debarred from doing so.

" This may be fair, but it does not appeal to one as such.

" Let the railways have fair play, and, with prosperous trade in the country, there need be little ground for losing faith in them, but a little more of the legislation dealt out lately, a few more useless and expensive requirements of the Board of Trade, the insistence in the demands for shorter hours at places where the business done will not warrant it, together with further increases of wages, under similar conditions, will tell their own tale.

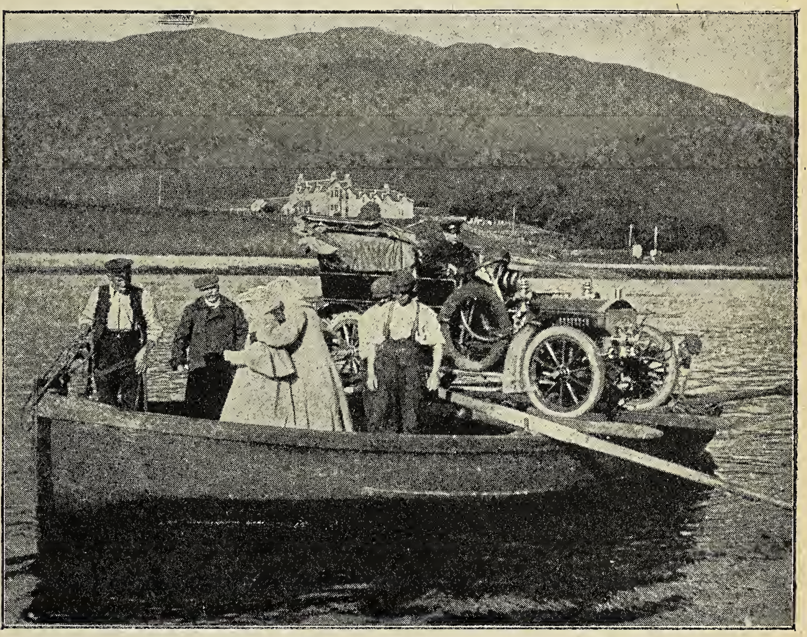
" Let us hope that all parties soon will come to see that the ability of railway companies to work their railways, so as to give the greatest possible facilities, means increased prosperity to the country, and to every one in it, for no one is wholly independent of railways. On the other hand, if they cripple the railway companies in the conduct of their railways, everyone will suffer, be he shareholder, merchant, manufacturer, or worker, for in that case the whole trade and welfare of the country will be adversely affected. Our foreign competitors will be the only gainers."

" I hope what you have just said, Mr. Millar, will be laid to heart in the right quarter.

" I greatly appreciate the trouble you have taken to say so much of interest concerning the Caledonian Railway."

" The readers of the RAILWAY MAGAZINE might like the following statistical information, showing the growth of the Caledonian Railway during the sixty years culminating in its Diamond Jubilee :—

1856 the length was 197 miles
1866 ,, ,, 574 ,,
1876 ,, ,, 753 ,,
1886 the length was 722* miles
1896 ,, ,, 828 ,,
1906 ,, ,, 957 ,,



Photo] [*Mr. W. Sparkes.*

" AT OWNER'S RISK ! "

The Motorist crossing the Loch on the primitive ferry row boat with his car, would doubtless much prefer to pay the railway charges, and have his car conveyed across the bridge the Caledonian Railway has constructed. The railway bridge at Connel Ferry has been built by the Caledonian Railway, with the view of accommodating the vehicular traffic, as well as railway trains, but up to the present, the authorities have come to no arrangement with the railway for the use of the bridge by the public.

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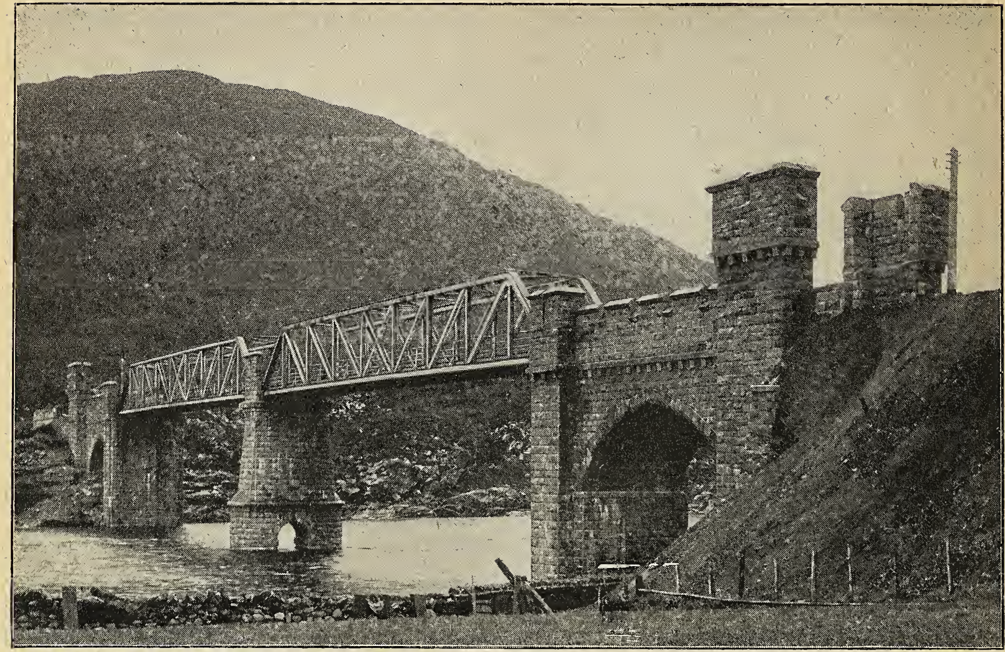
* The Portpatrick Railway, the mileage of which had been, up to 1885, included in the Caledonian Railway's mileage, then became joint property.



THE CREAGAN BRIDGE, ON THE BALLACHULISH EXTENSION.
Spans 150 feet clear. Rail level, 42 feet above high water.

"The capital of the company as orignally authorised was £1,800,000

In 1856 it was ...	£8,705,700	In 1886 it was ...	£41,107 000
,, 1866 ,, ...	£15,615,000	,, 1896 ,, ...	£49,670,000
,, 1876 ,, ...	£34,221,000	,, 1906 ,, ...	£56,170,000

"The revenue of the company for 1848, the first year after the opening of the line, was £252,074

In 1856 it was ...	£584,569	In 1886 it was ...	£2,851,798
,, 1866 ,, ...	£1,409 413	,, 1896 ,, ...	£3,648,158
,, 1876 ,, ...	£2,842,501	,, 1906 ,, ...	£4,402,142

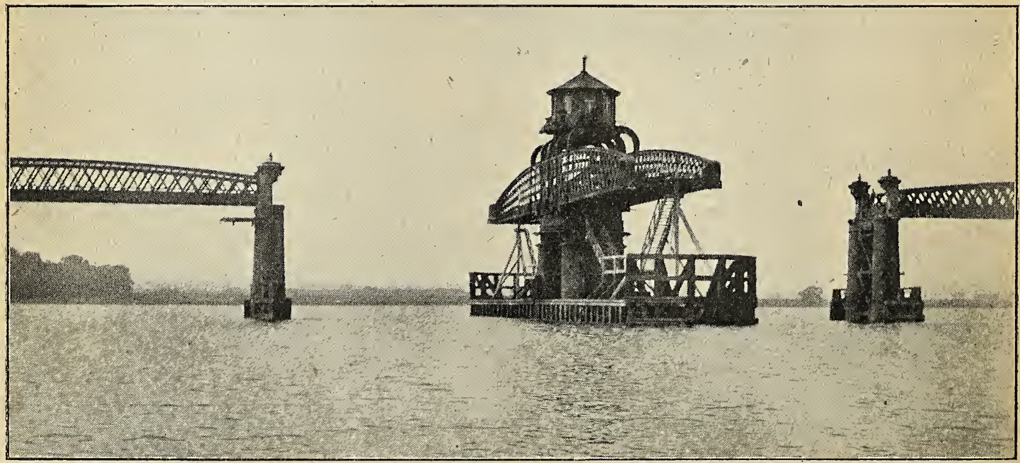
"The working expenses of the company in 1848 were £128,602

In 1856 they were	£285,744	In 1886 they were	£1,382,040
,, 1866 ,,	£595,204	,, 1896 ,,	£1,729,829
,, 1876 ,,	£1,349,471	,, 1906 ,,	£2,305,996

"This increase in the mileage, capital, revenue and working expenses has been reached by the process of extension, absorption, and improvement of lines.

"The 'worked lines' of the Caledonian Railway have a total mileage of about 180 miles, the joint lines 160 miles, and the foreign lines worked over 54 miles, so that the Caledonian engines work altogether a length of 1,254 miles."

G. A. SEKON.



THE CALEDONIAN RAILWAY'S FORTH BRIDGE. THE OPENING PORTION OF THE ALLOA BRIDGE.

THE CALEDONIAN RAILWAY'S DIAMOND JUBILEE.

Engineering Department.

By D. A. Matheson, M.Inst.C.E., *Engineer-in-Chief.*

PREVIOUS to the year 1835 considerable progress had been made in the construction of railways in England. The London and Birmingham, the North Union, and the Grand Junction Railways were practically completed, and formed one grand railway from London to Preston.

MR. DONALD A. MATHESON, M.INST.C.E.,
ENGINEER-IN-CHIEF.

In that year Mr. Joseph Locke, the eminent engineer, was asked by the Grand Junction Railway Company to survey the country between Preston and Glasgow for the purpose of ascertaining its practicability for the formation of a railway.

Mr. Locke reported giving the preference to a line *via* Dumfries and Nithsdale to Glasgow, rather than *via* Annandale and Lanarkshire (the Caledonian Railway route), chiefly for the reason that the difference in level between Beattock and the Summit, near Elvanfoot, was 700 feet, which, on a length of 10 miles, would give an inclination of 1 in 75, as compared with 1 in 180 to 1 in 200 for a length of 17 miles through Nithsdale, although increasing the distance from Carlisle to Glasgow by about 20 miles, and to Edinburgh by about 70 miles.

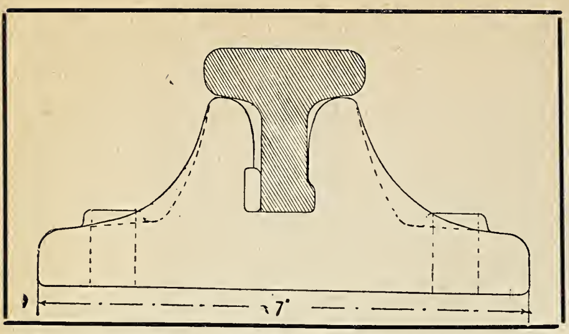
Meantime a committee of Glasgow gentlemen had agreed to support the Nithsdale scheme, and after considerable correspondence and negotiation, the Glasgow committee for the Nithsdale scheme, and the committee for the line *via* Annandale and Beattock, agreed that an impartial survey should be made, with the view of ascertaining the best possible line. Mr. Locke and Mr. John Miller were the engineers appointed to investigate matters, and after long and patient inquiry they reported—Mr. Locke on the 9th, and Mr. Miller on the 20th March, 1840—the former in favour of the Annandale and the latter of the Nithsdale route.

Meantime the Government had appointed Sir F. Smith and Professor Barlow as Royal Commissioners to report on the question of railway communication between London, Dublin, Edinburgh, Glasgow, etc.

The Royal Commissioners, after exhaustive inquiry, reported on 15th March, 1841, in favour of the Annandale route, under the supposition that one line of railway only was necessary from the South to Edinburgh and Glasgow.

In the interval the railway line had been extended from Preston to Lancaster, and a line authorised from Lancaster to Carlisle.

Plans were duly lodged for both the Annandale and Nithsdale lines, and they



CAST IRON CHAIR AND **T** RAIL, IN USE ON THE GLASGOW AND GARNKIRK RAILWAY IN 1831.
Weight of Chair, 8lbs.

came before Parliament as competing schemes.

The House of Commons Committee, on 7th May, 1845, met to consider the rival schemes, and a contest was entered upon, which has not since been equalled in railway struggles.

Evidence was led at great length, the preponderance of the Glasgow interest being for the Nithsdale line. The Edinburgh interest was divided; for whilst the Lord Provost was in favour of the Caledonian Railway, an ex-Provost was against it. Fifteen counsel were engaged on the Bills, and a host of witnesses were examined.

The House of Commons Committee, on 3rd June, found the preamble of the Caledonian Railway Bill proved.

The Bill was sent to the House of Lords, and the Committee met on 27th June. 115 petitions were presented in its favour, while the promoters of the Glasgow, Dumfries, and Carlisle Railway vigorously opposed.

On conclusion of the examination, the preamble was declared proved by that House on 5th July, and on 31st July the Bill became law by "The Caledonian Railway Act, 1845."

A contest was thus ended which cost the Caledonian Railway about £75,000.

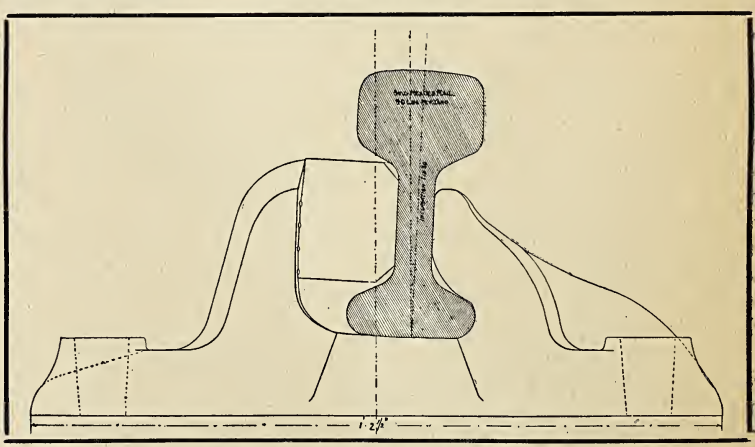
Acts of Parliament were also got in 1845 for the Scottish Central, Scottish Midland Junction, and Aberdeen Railways to complete through communication from London to Aberdeen. The Caledonian Railway Directors also made arrangements to acquire the Clydesdale Junction Railway, also sanctioned in 1845, which gave access to the south side of Glasgow and the Clyde.

The Caledonian Railway, as authorised under the Act, extends to 122 miles, as follows:—

	Miles.
Carlisle to Garriongill, near Wishaw	84¾
Edinburgh Branch, from Carstairs	27¼
Castlecary, from near Gartsherrie to Greenhill ..	10
	122

From Garriongill the Caledonian Railway had access to Glasgow over the Wishaw and Coltness and the Glasgow, Garnkirk, and Coatbridge Railways, the first passenger station being situated at the top of Glebe Street, St. Rollox.

The Directors decided to push on the construction of the railway with the greatest vigour, with the result that the first 40 miles, from Carlisle to Beattock, was opened for traffic on the 10th September, 1847, and to Edinburgh and Glasgow on the 15th February, 1848; Greenhill to Perth, 22nd May; to Forfar, 2nd August; and the Castlecary Branch, 7th August, 1850; and Forfar to Aberdeen at various dates from 1st July, 1848, till 1st April, 1850, when the



STANDARD CAST IRON CHAIR AND BULL-HEADED RAIL USED ON THE CALEDONIAN RAILWAY.
Weight of Chair, 46lbs.

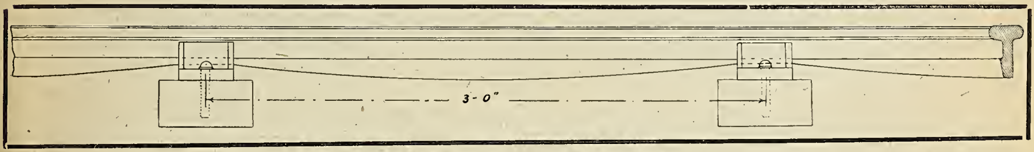
through communication from London to Aberdeen was completed.

The Caledonian Railway has been increased by the formation of numerous branches and by the amalgamation of the Scottish Central Railway, in 1865, and the Scottish North-Eastern Railway, in 1866, whereby 113 miles and 149½ miles respectively were added to the mileage. The Forth and Clyde and Monkland Canals, 52¼ miles, were added to the undertaking in 1867.

The mileage of the Caledonian Railway at present, including canals, joint and worked lines, and lines worked over, is 1,306¼ miles.

To Mr. Locke belongs the credit of laying out the great Scottish national system of railways extending from Carlisle to Aberdeen, and connecting the east and west coast shipping ports as in a network. He died at Moffat, on the 18th September, 1860.

The honour of originating the Caledonian Railway belongs to Mr. J. J. Hope Johnston and to Mr. Charles Stewart. The former died at Raehills, on 11th July, 1876, and the latter at Hillside, near Lockerbie, on 19th July, 1875.



FISH-BELLIED RAIL USED IN 1831.

The following extract from a speech delivered by the late Mr. Gladstone in the House of Commons, on the 4th May, 1888, during a debate on the proposed acquisition by Government of the railways of the United Kingdom, is interesting :—

"It is almost ludicrous to look back upon the infant state of the whole question at that period when compared with the enormous development it has now attained. As this subject is of great interest, perhaps I may mention a fact which is within my own knowledge and recollection—a fact of very considerable interest, which is highly illustrative of the manner in which this vast subject has passed beyond the region of all human computation. About the year 1841 or 1842, when I was at the Board of Trade, the question arose whether there could be a railway into Scotland. I think at that time we owed a great deal to a gentleman well known in connection with railways as a very bold and not at all unwise railway projector. I mean Mr. Hudson. It is a great mistake to look back upon him as a speculator. He was a man of great discernment, and possessing a great deal of courage and rich enterprise; and owing, perhaps, partly to him and partly to other men, we were bold enough at that day to entertain the idea of making a railway into Scotland; and the unusual course was adopted by the Government of Sir Robert Peel of appointing a Commission, or a scientific agency, to examine the whole question of what ought to be the line of railway into Scotland; and the House may be curious to know why it was the Government did so, when, I believe, there is no other example in the entire history of railways of their having attempted anything of the kind. I remember perfectly well the motive of the Government. The motive was that, as it was known, or firmly believed, to be absolutely impossible that there should ever be more than one railway into Scotland*—it was considered of the highest importance that the best scientific power of the country should be brought to bear on the choice of the line."*

The Caledonian Railway, in addition to the numerous lines and branches constructed by themselves, has amalgamated over 30 independent undertakings.

The more recent extensions of the Caledonian Railway are principally in the neighbourhood of Glasgow, and chief of these are the Glasgow Central Railway, the Glasgow Central Station Extension, the widening of a portion of the Wemyss Bay Branch Railway, and the reconstruction and extension of the station and pier at Wemyss Bay.

The reason for constructing the Glasgow Central Railway was threefold. In the first place, there was urgent necessity for forming a through connection between the Caledonian lines on the east side of Glasgow and the extensions towards Dumbarton on the west side, with a connection into the Queen's Dock at Stobcross; for, prior to the construction of the Central Railway, the Caledonian Railway Company was dependent upon the North British Railway Company for access to this dock. Then the congestion in the high level station compelled the Company to provide relief, and it hoped to meet the case in this respect by transferring to the low level station as many as possible of the trains having their destination within a distance of about 12 miles from Glasgow. And thirdly, the Central Railway passes under the busiest thoroughfares in the city, and it was confidently expected that a considerable volume of urban passenger traffic would be carried by the "Underground." This expectation might have been realised had the Glasgow Corporation not taken over the tramways and electrified them; but, immediately the conversion was made from horse to electric traction, the bulk of the urban traffic that the "Underground" had gathered during the first years of its existence was speedily lost.

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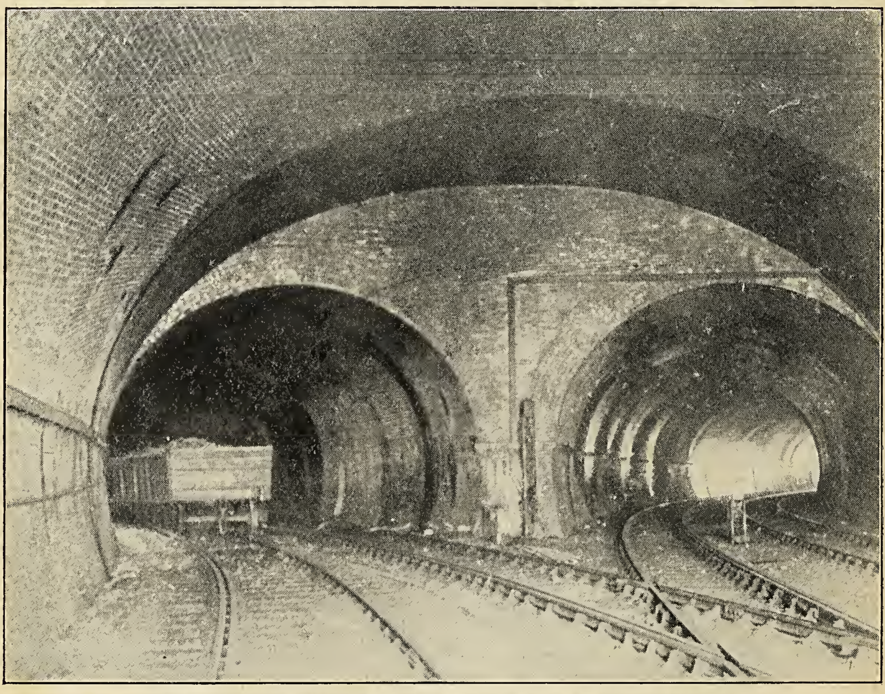
* The speech at these points was greeted with outbursts of laughter



BELL-MOUTHED TUNNEL AT STOBCROSS STATION, GLASGOW.

The view shows the junction of the Lanarkshire and Dumbartonshire Railway (on the left), with Glasgow Central Railway (on the right).

The Glasgow Central Railway was authorised in 1888, and in the following year it was vested in the Caledonian Railway Company. It extends from Strathclyde, near Rutherglen, to Maryhill and Dawsholm, a length of about seven miles, passing under Dalmarnock Road, Canning Street, London Street, Trongate, Argyle Street, Stobcross Street, Kelvingrove Park, Great Western Road, and Botanic Gardens, and emerging into the open again at Kirklee.

The junction at Strathclyde with the Dalmarnock Branch is a little to the north of the River Clyde at Rutherglen station, which had to be enlarged to accommodate the trains terminating there. The design of the station buildings at street level received very special consideration, in some cases these structures having the effect of decidedly improving the amenity of the surrounding districts, and in this connection mention might be made of the booking hall of Glasgow Cross station, designed by Mr. John J. Burnett, F.R.I.B.A., A.R.S.A., and the similar building at Botanic Gardens, designed by Mr. James Miller, F.R.I.B.A., A.R.S.A., and shown in the photograph on page 195.

The station buildings at platform level are tastefully designed with coloured enamelled tile facing, and the side retaining walls with white enamelled brick facing, thereby allowing of the surfaces being kept clean.

An important point on the Glasgow Central Railway is Stobcross station, where there is a connection to the Queen's Dock, at which a large coal-shipping industry is carried on, and where the Lanarkshire and Dumbartonshire Railway commences by a junction in the tunnel at the west end of the station, as shown in the photograph on page 194.

Maryhill station is a through station for the Lanarkshire and Dumbartonshire Railway traffic, and a terminus for the Central Railway trains. The other terminus at the west end of the railway—viz., Dawsholm—serves the extensive Gas Works belonging to the Corporation, and the Company's running sheds are also situated near it.

EXTERIOR OF BOTANIC GARDENS STATION, GLASGOW.

As showing the great development of traffic on the Caledonian Railway within recent years, it may be stated that, immediately after Central Low Level station was opened for traffic in August, 1896, the High Level station was still found to be congested. The Company was therefore, again obliged to consider how accommodation could best be provided for the enormous number of trains that were required for the ever-increasing traffic, and the result of the deliberations was the Caledonian Railway (General Powers) Act, 1899, which provided for the extension of Glasgow Central station as far as Hope Street on the west side, and the construction of a second bridge over the River Clyde.

It may be interesting at this stage to consider the development of the Caledonian Railway's terminal stations in Glasgow.

The genesis of the system now embraced within the Caledonian Railway was the Garnkirk and Glasgow Railway extending from its junction with the Monkland and Kirkintilloch Railway (the first public passenger railway in Scotland, opened in 1826) at Gartsherrie to St. Rollox, Glasgow, the access to the city station being from Glebe Street, near the north-east boundary of the city. This line was opened for traffic in 1831.

Simultaneously with the construction of the line from Carlisle to Garriongill, there were being constructed the Clydesdale Railway from Motherwell to the Pollok and Govan Railway at Rutherglen, and the Gushetfaulds Branch Railway from the Pollok and Govan Railway to South Side station. These lines were completed and opened for traffic in June, 1849, when the English traffic was worked into South Side station. In the meantime an extension of the Garnkirk Railway from Milton Junction to Buchanan Street station was being constructed, and on its completion in November, 1849, the English traffic was transferred to Buchanan Street station, where it continued to be dealt with for 30 years.

In addition to Buchanan Street station in the north of the city and South Side station in the south, the Caledonian Railway had had a terminus at Bridge Street since 1841, adjoining the south bank of the River Clyde, which was used for the traffic from Greenock and the coast, and at a later date—that is, from 1865—for the traffic from Wemyss Bay.

As the city developed on the north side of the river, it was found that South Side station was too far removed from the centre of traffic, and a Bill was promoted in Parliament for an extension from Gushetfaulds to Gordon Street, with a terminal station at the latter point.

The Act was obtained in 1873, and amended in 1875, and under its powers Glasgow Central station, immediately to the south and on the level of Gordon Street, was constructed and opened for traffic in 1879, when the English traffic was transferred to it from Buchanan Street station. The latter station has continued to the present day to be used for all the North traffic, and a few local trains to Motherwell and Hamilton.

In 1890 Glasgow Central station was extended by widening the bridge over Argyle Street and lengthening the platforms in a southerly direction, and this enabled the Greenock and Wemyss Bay trains to be worked into Central station, Bridge Street station then becoming a through station, the dock lines thenceforth being used for the storage and cleaning of carriages.

The last extension of Glasgow Central station was authorised in 1899, and completed in 1905, and, as a result, Bridge Street station has been abolished as a passenger station. The Caledonian Railway has, therefore, now only two terminal passenger stations in Glasgow, viz., Buchanan Street station for the North traffic, and Central station for the East, South, and West traffic.

St. Rollox and South Side stations are goods depots, while the area formerly occupied by Bridge Street station is covered with running lines and carriage sidings.

The ticket collecting station for Glasgow Central is Eglinton Street, which is at present being widened by the construction of two additional through lines and the corresponding platforms.

Prior to the commencement of the extension and reconstruction of Glasgow Central station in 1899 the station contained nine platforms, aggregating 1,530 yds. in length, and covering an area of 6,250 sq. yds., while the concourse measured 550 sq. yds. (illustrated on page 197). The station was approached by four lines of rails, carried on a bridge over the River Clyde.

As showing the magnitude of the extension works, it may be stated that the aggregate length of the 13 new platforms is 2,910 yds., or about 1⅗ mile, and they cover an area of 14,000 sq. yds., while the area of the concourse is 3,000 sq. yds.

Although the length and the area of the old platforms have been practically doubled, this has not been obtained by doubling the number of platforms, but by increasing their width from 15 ft. to a minimum of 23 ft., and adding four new platforms. A feature of the extension is the main departure platforms for trains for the South, which measure 900 ft. in length and 30 ft. in width, and the long and spacious main arrival platforms measuring 800 ft. and 700 ft. respectively in length, and 70 ft. across, and consisting of a cab rank 30 ft. wide in the middle and two side platforms, each 20 ft. wide. There is also a special platform nearly 1,000 ft. in length and 33 ft. in width, at which two trains may be dealt with simultaneously, as in the case of some of the platforms in Victoria Station, London, the permanent way being so laid out that the rear train can depart while the front train is standing at the platform. At the south end of the cab rank there is a special double-sided platform for fish, fruit, and milk traffic, the object being to keep these classes of traffic separate from the passenger traffic. This platform is situated over Broomielaw, adjoining the quay on the north side of the river, and, while there is vehicular access to it by way of the station cab rank, there is also communication with the street below by means of hoists.

The essential features of the station extension are—(1) a great increase in the area of the concourse; (2) a doubling of the platform accommodation by adding to the length, width, and number; (3) the construction of a new bridge over the River Clyde; and (4) the conversion of the dock lines in Bridge Street station into through running lines and storage sidings.

The incidental engineering works in connection with the carrying out of the scheme were the substitution of built steel octagonal columns for the masonry wall on the west side of the old station, the roofing of the new part of the station, the extension of the roof covering the old part of the station, the reconstruction of Argyle Street Bridge, involving the difficulty of carrying the foundations to a depth of 45 ft. below street level in order to be beyond the disturbing effects due to drainage of the Underground Railway; the raising of the old bridge over the River Clyde, the construction of low level lavatories under the concourse, the construction of a parcels office at street level under the station, and the provision of a conspicuous train information screen, a left luggage room, a shop parcels room, and the other necessary station offices.

Glasgow Central station, although having direct access at the north end from Gordon Street on the level, is structurally a high level station; for, while the streets parallel to the station fall in a southerly direction, the station rises in the same direction, with the result that the rails are so high above the first transverse street—viz., Argyle Street—as to give a clear headway of 18 ft. The greater part of the rise between Gordon Street and Argyle Street is obtained in traversing the booking hall and the concourse, although it is not appreciably felt by passengers using the station; on the other hand, the gradient of the rails from the buffer stops to Argyle Street is 1 in 185. From Argyle Street southwards, as far as the works extend, the gradients are practically level.

The shape of the ground available for the station being narrower at the main entrance from Gordon Street than near the middle, gave rise to an initial difficulty in connection with the planning of the arrangements, which was overcome by setting the centre line of the concourse in a direction running from north-east to south-west, with the Gordon Street entrance at the north-east end and the Hope Street entrance at the south-west end. The accesses to the station, while they remain as before, viz., one in Gordon Street, one in Hope Street, one in Argyle Street, and one in Union Street, have been entirely reconstructed, and in their reconstruction they have been made more spacious and convenient. The subways in connection with the Hope Street and Argyle Street entrances call for special notice, for, instead of being narrow, as is usually the case, the main portions are really in the form of halls and well lighted, with the result that the cramped feeling pertaining to the usual subway is altogether dispelled.

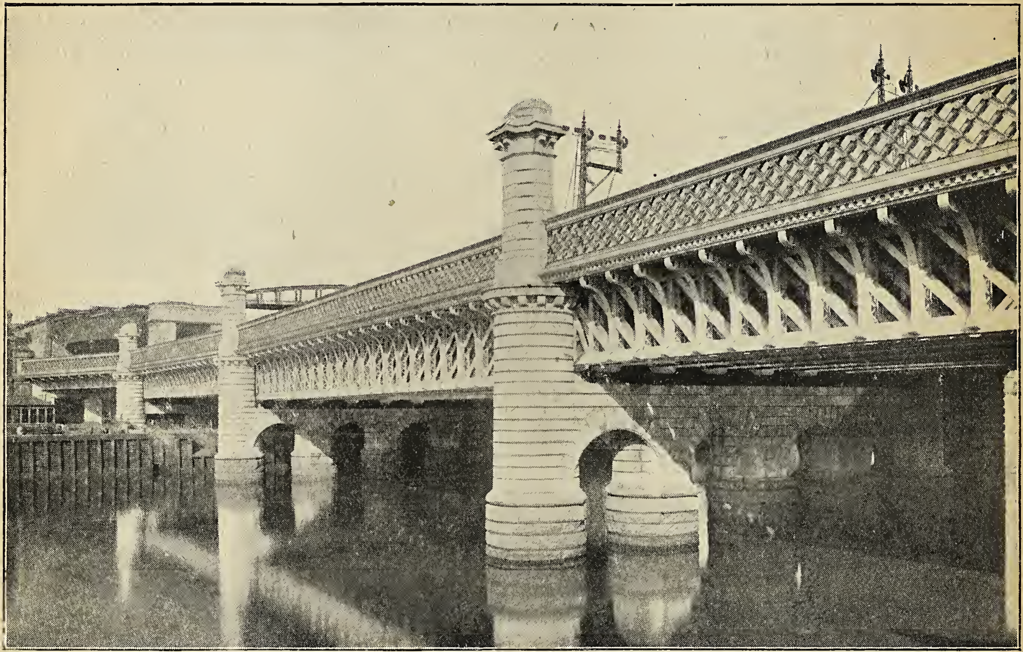
THE 1899 NEW YEAR'S CROWD AT GLASGOW CENTRAL STATION.

As already stated, the main entrances to the concourse are at the ends, so that passengers have to walk along it in order to reach their train. Advantage has been taken of this circumstance to place the train information screen in an unobtrusive but conspicuous place on the north-west side of the concourse immediately over the general waiting room and telegraph office. This screen has a separate space for each of the 13 platforms, and, besides exhibiting the hour at and the number of the platform from which the train starts, it also indicates the name of every station at which the train stops. At another portion of the screen information is given in regard to arriving trains. The concourse is surrounded by the usual station offices.

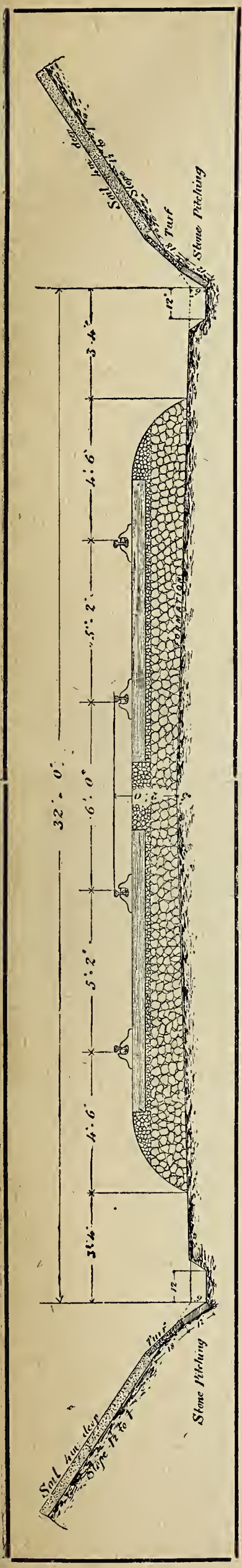
The extension of the station to the north of Argyle Street has a sub-structure of steelwork, the area at street level being used for the very large parcels traffic dealt with at Central station. There is a cart road inside the parcels office similar to that in a goods shed, and the vans are loaded and unloaded at a raised platform. There is communication by means of passages, and a series of hoists between the parcels office and the station platforms overhead so arranged as to obviate the necessity of wheeling barrow-loads of parcels across the concourse in order to get to the several platforms.

The new bridge over the River Clyde and the adjoining streets (illustrated above) is an imposing structure of five spans, the lengths of the three river spans being 160 ft., 200 ft., and 178 ft. respectively. There are two land piers and two river piers, consisting of steel caissons sunk to a depth of about 50 ft. and 66 ft. respectively below high water level. The pillars are lintelled, in order to afford a bearing for the open web lattice main girders, which are spaced at about 12 ft. centres. Hobson's flooring rests on the top booms of the main girders, and presents a flat, uninterrupted surface for the permanent way. The great width of the new bridge, which is 110 ft. on the average, necessitated the main girders being entirely under the floor; and, in order to give the statutory headway over the river, and at the same time have an economic depth of girder, the rail level on the new bridge had to be made higher than the original rail level on the old bridge, which consists of two main girders for each span and flooring resting on the bottom booms. The difference of level was as much as 3 ft. at the north end and 2 ft. at the south end, but this difference has been eliminated by raising the old bridge. The old bridge carries four lines of rails, and the new bridge nine lines of rails; that is to say, there are now 13 lines of rails across the river, the two bridges thus affording probably the widest railway crossing of a river in the world.

Through Bridge Street station there are 17 lines of rails in all, made up of eight running lines and nine carriage sidings. These carriage sidings are calculated to afford great help in connection with the working of traffic in the Central station, especially on holidays,



THE NEW BRIDGE CARRYING THE CALEDONIAN RAILWAY ACROSS THE CLYDE AT GLASGOW.



SECTION OF STANDARD PERMANENT WAY AS LAID IN A CUTTING.

as they are long enough to contain whole trains, which will be propelled across the bridge into the station as the platforms are vacated by other trains.

The roof over the new part of the station and the extended roof over the old part of the station are unlike the old roof, inasmuch as the bottom boom of the main girders is semi-elliptical in form instead of being straight. The result is that the roofs have, perhaps, the appearance of being loftier than they really are, and the effect of the vista, especially in the case of the roof over the extended portion of the station, which is nearly 1,000 ft. long, is very marked. The roof couples are semi-circular on the soffit, and spring from the vertical members of the main girders.

All the platforms, with the exception of those adjoining the cab rank, are shut off from the concourse with wrought iron railings and gates. Hydraulic buffers have been provided for all the 13 lines of rails.

There is an installation of 25 clocks throughout the station, controlled electrically from a master clock placed in the telegraph office.

The points and signals are still being worked manually, but an installation of the electro-pneumatic system of power working is in course of being laid down.

In the year 1899 an Act was obtained to widen the Wemyss Bay Railway from a single to a double line over its whole length, and to extend and enlarge the pier at Wemyss Bay. Only six miles, however, have been doubled, viz., the length of two miles from the junction to a point just beyond Upper Greenock station, and the length of four miles from Dunrod passing place, through Inverkip to Wemyss Bay station. The work involved the driving of additional single-line tunnels at Cartsburn and Inverkip alongside the existing single-line tunnels, the construction of viaducts over the Rivers Kip and Daff, and the reconstruction and enlargement of the stations at Upper Greenock, Inverkip, and Wemyss Bay. Fortunately, all the overbridges had, in the first instance, been built sufficiently wide for two lines of rails, and considerable expense was thereby saved when the doubling came to be carried out.

At Wemyss Bay station (illustrated on page 200) there has been a veritable transformation. For, whereas the old station had only two platforms and very limited waiting room accommodation, the new station has a complete suite of waiting rooms and other offices, and four passenger lines adjoining two island platforms, with a third road between the two main roads to allow of an engine rounding its train at rest at the platform. The convenience of this arrangement is inestimable when it is remembered that the steamers and the train arrive at Wemyss Bay simultaneously and exchange passengers.

The permanent way of the Caledonian Railway may safely be said to be up to the standard of that of the premier railways of Great Britain, and it is maintained in such condition as to ensure the absolute safety of the travelling public. A section of the standard permanent way of a double-line railway in cutting is shown on this page. The slopes of the cutting, which is 32 ft. 4 in. wide at formation level, are not steeper than 1½ to 1, and are covered with soil to a depth of 4 in., and sown with grass seed. The formation has a fall of 5 in. from the centre towards the sides, so that all rain water that does not percolate into the ground is led into the side ditches, which are formed at the toe of the slopes. The need of thorough drainage of the permanent way is clearly recognised, and good fall and ample drains are therefore provided.

The ballast consists of good, old, hard and clean iron works' slag, and of broken granite, the bottom ballast, which occupies the space between formation and a level 2 in. below the underside of the sleepers, being broken to pass through a 3-in. ring, and the top ballast to pass through a 1½-in. ring. The depth from the upper surface of rails to formation at the centre is 2 ft. The sleepers, which are of Baltic redwood or Scotch fir, creosoted, are 9 ft. long by 10 in. wide by 5 in. thick, and are spaced at 2 ft. 8½ in. apart centre to centre, except at the joints, where the spacing is 2 ft. 2½ in. The cast iron chairs, weighing 46 lbs. each (see illustration on page 192), are attached to the sleepers by means of four spikes ⅞ in. in diameter and 5¾ in. in length. The bearing area of the chair on the sleeper is 104 sq. in. The rails are in lengths of 32 ft., the section used for main lines weighing 90 lbs. per yd., and that for branch lines 80 lbs. per yd. They are securely held in the chairs by means of oak keys, 7 in. long by 2½ in. deep by 2⅛ in. wide. The joints in the rails are made with pairs of fishplates 18 in. in length and weighing 22 lbs. per pair. The holes in the fishplates are pear-shaped to fit the neck of the bolts, which are ⅞ in. in diameter and 4¼ in. in length, and of which there are four to each joint. Between the nut of each bolt and the fishplate there is a Grover washer, which prevents the nut from working loose. Guard rails are used on curved portions of running lines under 15 chains radius, and on all curves the outer rail is superelevated to an extent varying from 5 in. for a 10 chain curve to 1¾ in. for an 80 chain curve. The superelevation of the rail is full at the tangent point and constant round the curve, and is run out on the straight at a gradient of about 1 in 600.

The strength of the permanent way has undergone a considerable change since the opening of the Garnkirk Railway in 1831, when the fish-bellied malleable iron rails (illustrated on page 193) were supported on cast iron chairs, weighing 8 lbs. each (see illustration on page 192), and spiked into transverse sleepers placed 3 ft. apart. In those days the "George Stephenson," built by Robert Stephenson and Company, and weighing 8 tons, was the standard locomotive. In later years, when locomotives weighing 63 tons for a length of 47 ft. 5 in. over the buffers were introduced, the weight of the rail was 75 lbs. per yd. It was subsequently increased to 80 lbs., and since 1886 it has been 90 lbs., the weight of the heaviest locomotives being now 130 tons for a length of 65 ft. 6 in. over the buffers.

All the constituent parts of the permanent way are thoroughly and systematically inspected before being put into the line. This is especially the case with rails, upon which the safety of the travelling public depends to such an extent. Their manufacture is watched in all its stages, from the mixing of the metal in the furnace to the straightening and drilling, with the result that practically all defects are eliminated, and there is obtained a homogeneous material able to withstand the severe strains to which it is subjected by the heavy locomotives.

THE PRESENT RAILWAY STATION AND STEAMER PIER AT WEMYSS BAY.

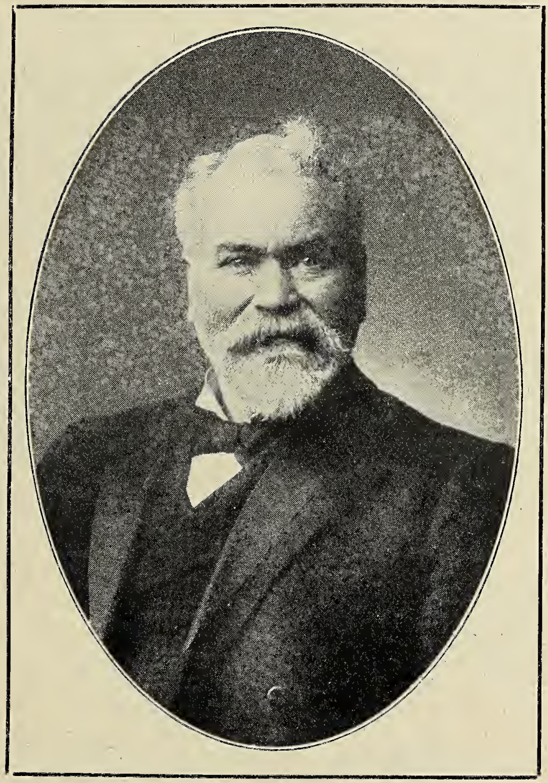
The Evolution of the Rolling Stock.

By J. F. McIntosh, *Locomotive Superintendent.*

In no phase of its successful career does the Caledonian Railway show to better advantage than in the efficiency of its rolling stock—both past and present.

Of course there were railways in Scotland prior to the advent of the Caledonian, and as the result of judicious absorption of and amalgamation with a number of these pioneer lines, dating from 1831—on some of which the concluding chapter of the battle of "the locomotive *versus* the horse" had been fought—the Caledonian Railway from time to time found itself in possession of an extensive variety of nondescript and even freak vehicles. There were wagons which carried excursion traffic when not required for coal; open seatless carriages in which unprotected passengers had to struggle with the elements and live sparks from the engine, getting sometimes pitched overboard into the bargain; and locomotives bearing such fanciful names as *Lucifer, Mercury, Sirocco, Hercules,* etc. Some of these had wooden wheel centres, others had upright cylinders and crossbeams, and frequently they became so incapacitated as to necessitate temporary replacement by horses.

A certain proportion of these antiquated legacies was subsequently allowed to end their days naturally in the by-paths of the system—for money at times was not too plentiful wherewith to have everything spic and span—but to a large extent there was a wholesale "slaughter of the innocents"—the pity, however, is that some of the quaintest of these relics were not preserved as object lessons of rebuke to unreasonable grumblers of a later day.



MR. J. F. McINTOSH, LOCOMOTIVE SUPERINTENDENT.

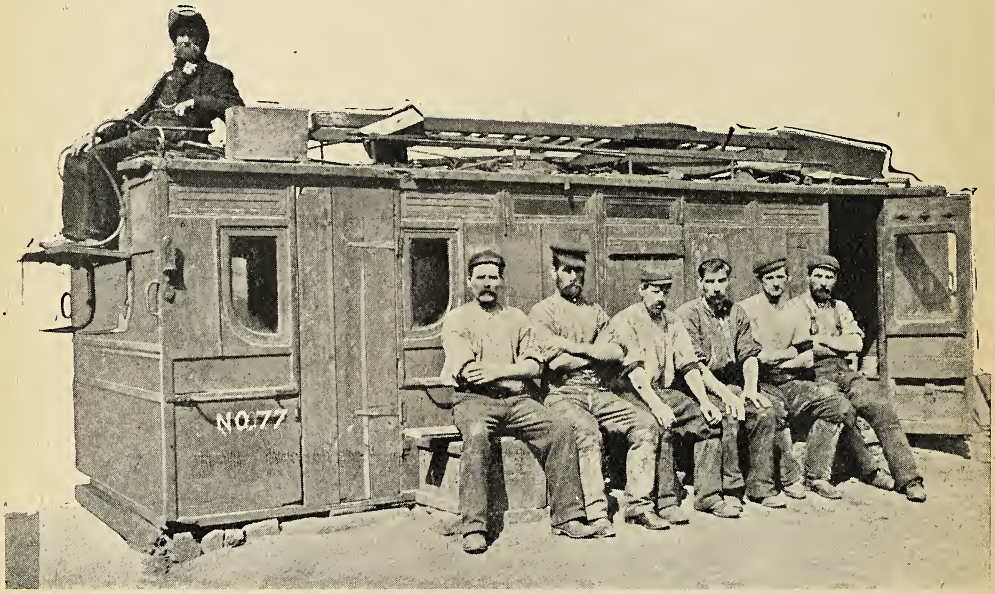
But to come to Caledonian Railway plant proper. The Company emerging triumphant from the trying Parliamentary enquiry anent its formation, and wisely realising that great things were expected of it, considered that in the matter of rolling stock the best was not too good for them, and, accordingly, that memorable morning sixty years ago, when the first part of the line was opened, found them exceedingly well equipped, considering the period.

Whilst the earliest Scotch wagons consisted of small rough boxes holding but a few hundredweights, the Caledonian Railway commenced with substantial vehicles, 11 feet long by 2½ feet deep, and holding 6 tons of general goods, or from 4½ to 5 tons of loose coal, as well as open trucks for sheep and cattle, and small covered vans. As business prospered, specially designed vehicles were early provided for specific traffic such as milk, fish, ale, timber, bar-iron, pig-iron, cheese, bullion, etc.; and, lest it be presumed that looking ahead is a purely twentieth-century faculty, it must be recorded that in addressing the shareholders in the report for the half year ending January, 1858, Mr. Christopher Johnstone, the then General Manager, alluded with pride to the fact that a thirty-ton wagon had been put on the line, presumably, as an experiment.

Gradually the capacity of the standard merchandise wagon rose successively to seven, eight, ten, and then sixteen tons. In recent years the Caledonian Railway led the way with the introduction of 30-ton merchandise wagons, of which they have now 400 in very profitable service. From the peculiarly varied nature of the territory traversed by the line, it goes without saying that a list of the industries carried on really makes an epitome of the trade of the country, and to foster these multitudinous activities has always been the policy of the Caledonian Railway, particularly in providing means of transport suited to the purpose, be the commodity live fish from the hatcheries, steamboats in sections, dynamite, dangerous acids, wild animals, race horses, prize cattle, export locomotives, or any of the countless engineering productions, of the most fantastic shapes and perplexing dimensions, etc. Besides what are termed ordinary merchandise and mineral stock, there is at present on the line 903 fifteen-ton rail wagons, 133 thirty-ton bogie bolster wagons, and 86 trucks specially suited for large machinery, girders, boilers, ingots, glass, furniture vans, etc., with carrying capacities ranging from 10 to 50 tons.

Amongst the latest built varieties are 40-ton hopper mineral wagons, motor-car vans, refrigerator vans, tramway car wagons, 20-ton goods brake vans to control heavy trains, etc.

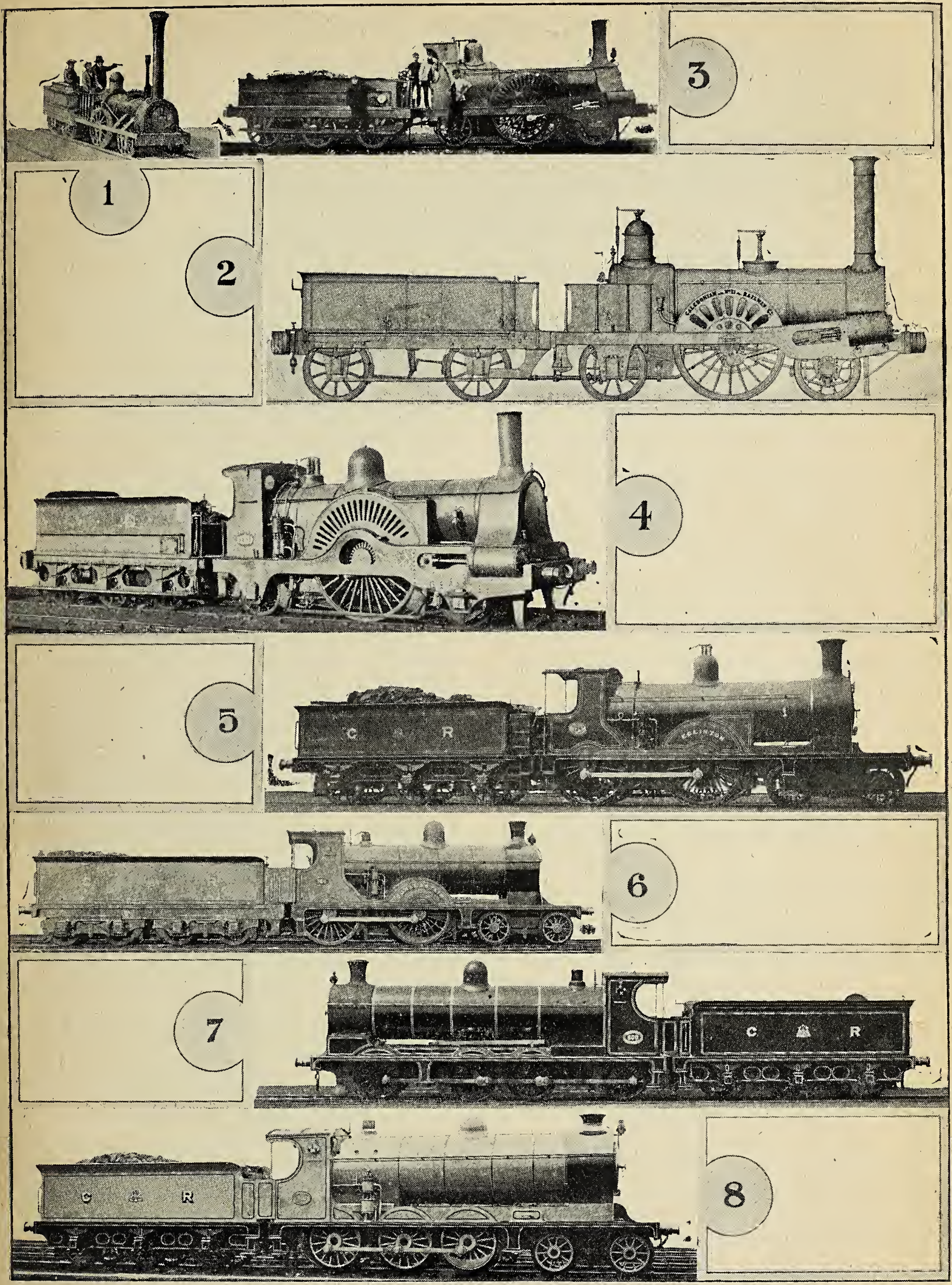
Eight years ago the Caledonian Railway put a 50-ton wagon in traffic; but, although found to be very useful, it so far remains the sole representative of its race. Most probably it is a case of taking time by the forelock.



A RELIC OF THE ABERDEEN RAILWAY, PRESERVED BY THE CALEDONIAN RAILWAY.
Carriage built about 60 years ago, with guard's seat on top.

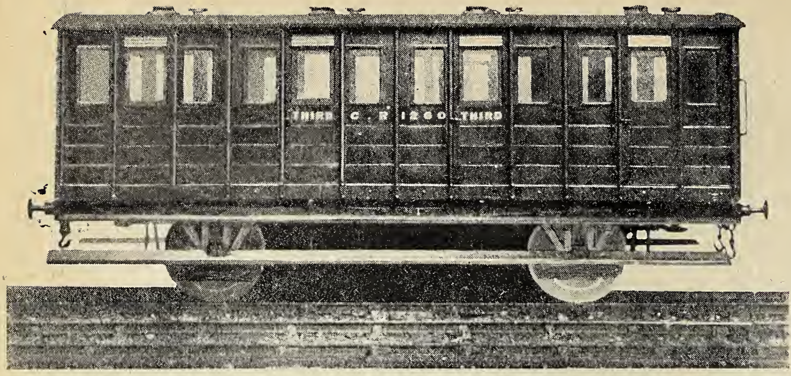
As regards passenger rolling stock, the first style of carriage on the Caledonian Railway was the four-wheeler, measuring 18 ft. long and 5 ft. 6 in. high inside. It contained four compartments, with 19 in. by 15 in. door lights, and 16 in. by 10 in. quarter lights, the doors being 19 in. wide. Each compartment had an oil roof lamp, was ventilated by three narrow slits above the doors, and accommodated eight passengers, or 32 per coach.

In this connection it is interesting to recall the fact that so far back as 1848 the late Queen Victoria, accompanied by the Prince Consort and their young family, were so



THE EVOLUTION OF THE LOCOMOTIVE ON THE CALEDONIAN RAILWAY.

1. *St. Rollox*, a 'single' of the Glasgow and Garnkirk Railway, 1831. Driving wheels, 5 ft. diameter; cylinders, 10″ × 14″ stroke.
2. One of the original 6 ft. 'single' engines at the opening of the Caledonian Railway, 1847. Cylinders, 15″ × 20″ stroke.
3. 7 ft. 'single,' 1857. Cylinders, 16″ × 20″ stroke.
4. Conner's 8′ 2″ 'single,' 1867. Cylinders, 17″ × 24″ stroke.
5. *Eglington*, 6′ 6″ 4-coupled, 1887. Cylinders, 18″ × 26″ stroke.
6. *Dunalastair*, 6′ 6″ 4-coupled, 1897. Cylinders, 19″ × 26″ stroke.
7. 8-coupled, 4′ 6″ goods. Cylinders, 21″ × 26″ stroke.
8. 6-coupled 5ft. bogie passenger. Cylinders, 19″ × 26″ stroke.



EARLIEST TYPE OF CALEDONIAN RAILWAY 3RD CLASS COVERED CARRIAGE.

pleased with the comfort afforded by one of the ordinary carriages in which they travelled by special train all the way from Montrose to London, that at the *dejeuner*, on arrival at Beattock, Her Majesty took the trouble to compliment the Caledonian Railway directors on the fact.

Notwithstanding, these early coaches—with their primitive equipments—left much to be desired, which time was to accomplish nowhere earlier than on the Caledonian Railway. The modest four-wheeler gradually gave place to six-wheeled ones, and these again were superseded by sweetly swaying coaches, 45 ft. long, running on four-wheeled bogies, and subsequently increased to 48 and 50 ft. in length. More light by day and by night was gradually available, and cushions, and sitting, and breathing space kept pace in the march of progress.

To-day the Caledonian Railway's standard carriages are of two varieties, corridor and non-corridor, 65 ft. and 68 ft. long, running on six-wheeled bogies, both replete with all the fittings and conveniences that skill and art can devise, and that money can provide, as everyone knows who has patronised them. They have very aptly been termed "the triumph of luxury and comfort." Some of these coaches seat comfortably 132 passengers each, and a large number of trains running locally include breakfast, luncheon, tea, and dining cars.

After enjoying a ride, say, to Gourock or Wemyss Bay by the "Clyde Coast Express," or to Aberdeen in the "Grampian" corridor dining express, and afterwards inspecting the three compartment carriage of 1848 (illustrated on page 202), with its guard's outside seat and luggage rack on the roof (which the Caledonian Railway preserves at St. Rollox), a passenger would feel inclined to declare with Sydney Smith—

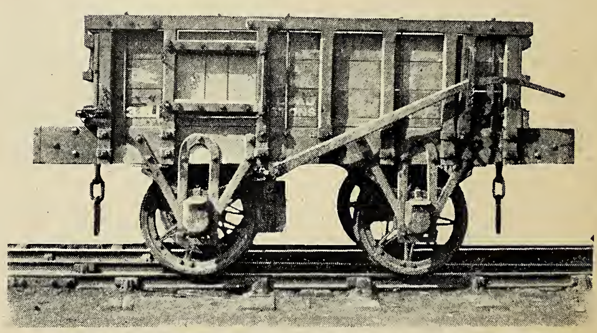
> "The good of ancient times let others state,
> I think it lucky I was born so late."

In the matter of motive power the Caledonian Railway record is a particularly brilliant one.

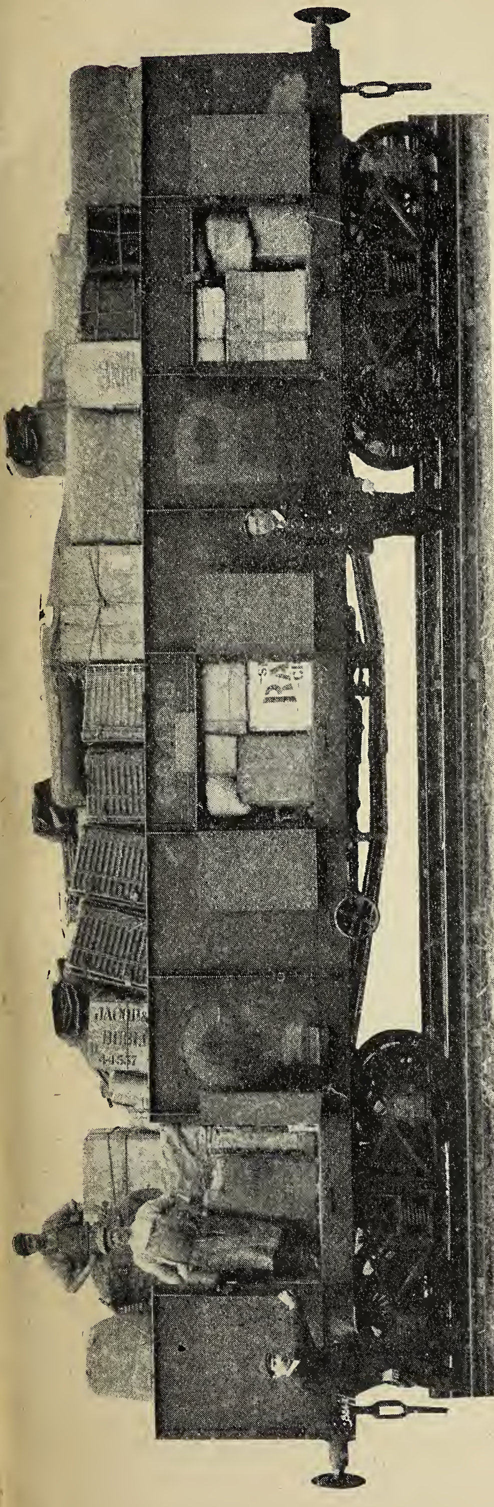
At the outset it was open to the railway to avail itself of the almost general and easy method of ordering so many engines at a certain price from outside locomotive builders; but, having a very difficult line to work, they were *taking no chances*. In point of fact, a portion of their route, namely, the well-known Beattock bank, rising about 700 ft. in 10 miles, was at first pronounced to be insurmountable by locomotives, and the suggestion was made, in all seriousness, to work it by stationary engine haulage, but the directors disdained such a movement. Still, the inevitable result followed, and this incline has been a tremendous handicap all along.

The directors, therefore, with characteristic enterprise, decided that the Company should design and build its own engines, which, accordingly, was done in its workshops (then at Greenock) during 1846 and 1847, in readiness for the opening.

Mr. Robert Sinclair, who subsequently filled the dual position of locomotive superintendent and general manager to the Caledonian Railway, was then in charge of the



EARLIEST TYPE OF CALEDONIAN RAILWAY WAGON.



30-TON BOGIE WAGON LOADED WITH GENERAL GOODS.

locomotive department, and the class of engine he designed for the occasion—and in which he incorporated the best features of the finest models then at work—was a conspicuous success.

It had six wheels, the middle pair being single drivers 6 ft. in diameter, the leading and trailing wheels 3 ft. 6 in. It had outside inclined cylinders, 15 in. diameter and 20 in. stroke. The heating surface was 770 sq. ft., grate area 10½ sq. ft., steam pressure 90 lb. per sq. in., and the tractive force 2,344 lb. The tender was carried on four wheels, 3 ft. 6 in. in diameter, and the tank held 800 gallons of water. The engine and tender, in working order, weighed 28 tons.

To detail the evolution of the Caledonian Railway's locomotives during the 60 eventful years that are gone, or even to merely mention the various types, is out of the question in this brief "impression." After all is said, a railway is judged by the performances of its main line express passenger engines. Only these, therefore, will be noticed in quick review and by decades.

The progress made in the 10 years succeeding the opening of the line is represented by Mr. Sinclair's 16 in. by 20 in. by 7 ft. single engine (Fig. 3 of the illustration on page 203), which was a carefully designed enlarged edition of his first. In it he had increased the diameter of the cylinder by 1 in., and the tractive force (or pulling power) by 3,141 lbs.

Representing the second decade is Mr. Benjamin Conner's 17 in. by 24 in. by 8 ft. 2 in. single engine (Fig. 4). Another inch had been added to the diameter of the cylinder, and 4 in. to the length of piston stroke, the tractive force being increased by 1,559 lbs. This stately engine, with its monstrous and steady stride, was long the admiration of the whole country. Shortly after its appearance an eminent firm of locomotive builders, by permission of the directors, built and exhibited—as a specimen of their handiwork—for London's International Exhibition of 1862, an exact replica, which was quickly purchased by the late Khedive of Egypt.

So far ahead had Mr. Conner seen that we find this same class of engine, with but slight modification, still maintaining the prestige of the Company in the third decade—that is to say, for a period of, roughly, 20 years. But by stress of circumstances, consequent on the great increase in train loads, it had, perforce, to fall back in the ranks during the fourth decade in favour of Mr. Dugald Drummond's 18 in. by 26 in. by 6½ ft. four-coupled engine (Fig. 5) which shows an advance of an inch in the cylinder's diameter, 2 in. in the stroke, and 5,856 lb, in the tractive force. One of this class was shown at the Edinburgh International Exhibition of 1886.

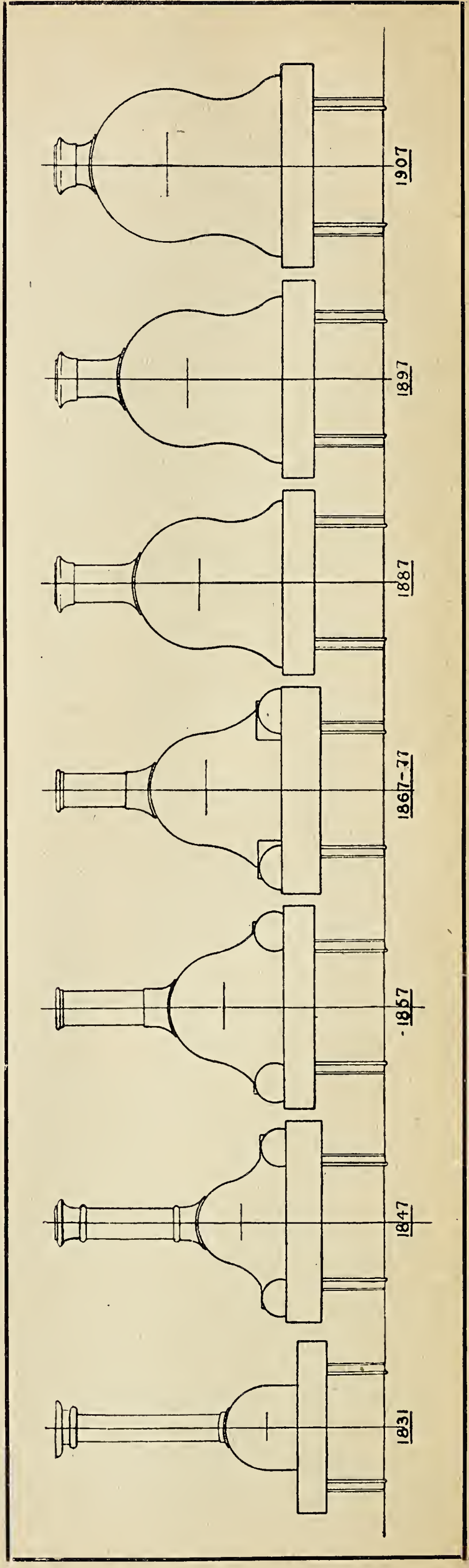
In the fifth decade Mr. John F. McIntosh, the present locomotive superintendent, ably maintained the rate of progress by his 19 in. by 26 in. by 6½ ft. four-coupled "Dunalastair" class (Fig. 6), in which an additional inch had been added to the diameter of cylinder and 3,940 lb. to the tractive force. By adopting this type of engine for their International express service a few years ago, the Belgian Government paid the Caledonian Railway a unique compliment. It was within this epoch that Caledonian engines took part in what is known as the record railway run in this country, when the West Coast tourist express travelled from Euston to Aberdeen—541 miles—in 512 min., on August 22nd, 1895, the Caledonian engine completing the last section at a sustained speed of 71 miles 62 chains per hour.

Just now, at the close of the sixth decade, we have Mr. McIntosh's 20 in. by 26 in. by 6½ ft. six-coupled "Cardean" class (illustrated in the coloured plate, issued with this number of the Railway Magazine), built last year, in which has been added still another inch to the diameter of the cylinder and 4,493 lb. to the tractive force. It has been described by the technical engineering journals as "one of the most notable types of passenger engine now running in Great Britain," and is too well known to require further comment.

To witness "Cardean," or any of its sister engines, not like the 6½ ton engine "George Stephenson" at the opening of the oldest part of the Company's system (the Garnkirk Line) in 1831, "with a prodigious load equalling nearly 20 times its own weight, advancing with perfect freedom and with the speed of a stage coach," but with a 350 ton West Coast express climbing the 10 mile Beattock bank in 16 min., and not merely from a level, but actually from a 1 in 200 ascending slope, is to see as fine a performance as can be done anywhere.

The progress for the 60 years noted above is well summarised in the table at the top of page 207.

To put it in another, and, perhaps, the most graphic way, is to show the gradual increase in the size of boiler (the most potent factor), and the corresponding curtailment in the height of chimney, as is done in the



60 YEARS' INCREASE OF BOILER AND DECREASE OF CHIMNEY OF CALEDONIAN RAILWAY LOCOMOTIVES.

SIX DECADES IN THE EVOLUTION OF THE CALEDONIAN RAILWAY'S LOCOMOTIVES.

	At Opening of Line in 1847. Fig. 2. Page 203.	1857. Fig. 3. Page 203.	1867. Fig. 4. Page 203.	1877.	1887. Fig. 5. Page 203.	1897. Fig. 6. Page 203.	1907. Coloured Plate
Cylinders .. Dia. & stroke	15 × 20	16 × 20	17 × 24	Same as Second Decade.	18 × 26	19 × 26	20 × 26
Driving wheels .. Diameter.	6ft. 0in.	7ft. 0in.	8ft. 2in.		6ft. 6in.	6ft. 6in.	6ft. 6in.
Heating surface Square ft.	770	885	1,002		1,200	1,500	2,400
Grate area .. Do.	10½	11½	13		19½	20¾	26
Tractive force .. lbs.	2,344	5,485	7,044		12,900	16,840	21,333
Boiler pressure .. lbs. per sq. in.	90	120	130		160	175	200
Tank capacity .. Gallons.	800	1,580	1,800		3,560	4,125	5,000
Weight of engine and tender .. Tons.	28	30	61¾		85¾	94	130

accompanying scale diagram, extending from the Garnkirk engine of 1831, with its 6 ft. 9 in. chimney, to the "Cardean," with 1 ft. 4$\frac{15}{16}$ in.

As befits a line depending for the greater part of its revenue on the carrying of goods and minerals, the Caledonian Railway has always seen to the adequate provision of specially powerful engines for that branch of traffic. In these there has been a corresponding improvement since the early days till now when the 19 in. by 26 in. by 5 ft. six-coupled express goods (or 918 class), and the 21 in. by 26 in. by 4 ft. 6 in. eight-coupled main line mineral (or 600 class) stand out as very fine specimens of the mechanical beast of burden at its best.

Other standard classes of the present day are the following :—

140 class	19 × 26 × 6 ft. 3 in.	four-coupled bogie passenger, for main line.
908 ,,	19 × 26 × 5 ft. 9 in.	six-coupled bogie passenger, for coast, etc., traffic.
55 ,,	19 × 26 × 5 ft. 0 in.	six-coupled bogie passenger, for Oban line. Fig. 8, page 203.
812 ,,	18½ × 26 × 5 ft. 0 in.	six-coupled express goods.
784 ,,	18 × 26 × 5 ft. 0 in.	six-coupled tank. Short distance mineral.
494 ,,	19 × 26 × 4 ft. 6 in.	eight-coupled tank. Short distance mineral.
169 ,,	17 × 24 × 4 ft. 6 in.	four-coupled bogie tank. Suburban passenger.
438 ,,	18 × 26 × 5 ft. 9 in.	four-coupled bogie tank. Short distance passenger (some fitted with condensing apparatus for underground).

Needless to say, these successive stages of progress represent infinitely more than the occasional increment of an inch or two to the dimensions of the cylinder or a change in size of driving wheel. It means, in effect, the taxing of the whole range of engineering resources, and the wonder is not at the constant increase in efficiency, but that it has been possible during the latest decade to make greater advance than in any that preceded it.

The aggregate tractive force of the Company's stud of locomotives now stands at 13,606,953 lb., and, taking double shifting into account, the engines daily in steam average 1,040, whilst the miles run by engines totals 28,456,047 per annum.

The table at the bottom of this page shows the growth of the Company's rolling stock, exclusive of duplicates.

From this it is seen that between the first and last decades the number of locomotives has increased five times, carriages seven times, and wagons about twelve times.

The large increases in the second decade were due to taking over the stocks of the Scottish Central and Scottish North-

TOTAL NUMBER OF VEHICLES.

	1857.	1867.	1877.	1887.	1897.	1907.
Locomotives	184	479	649	690	750	922
Coaching plant	341	1,068	1,528	1,660	1,963	2,381
Wagon do.	5,600	13,505	34,661	44,454	58,021	65,731

Eastern Railways at the amalgamation, and that in the third arose through acquiring the wagons belonging to traders on the Caledonian Railway.

The Company has always taken a pride in building its own rolling stock (except in very unusual circumstances), and it is interesting to note that during the past 12½ years there have been turned out of St. Rollox, new—

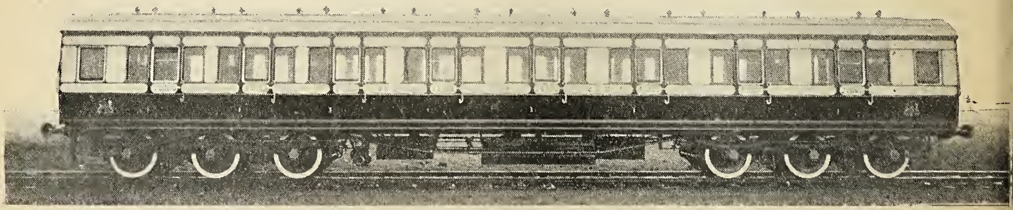
549 Engines,
1,208 Carriages, and
33,098 Wagons,

which speaks for itself.

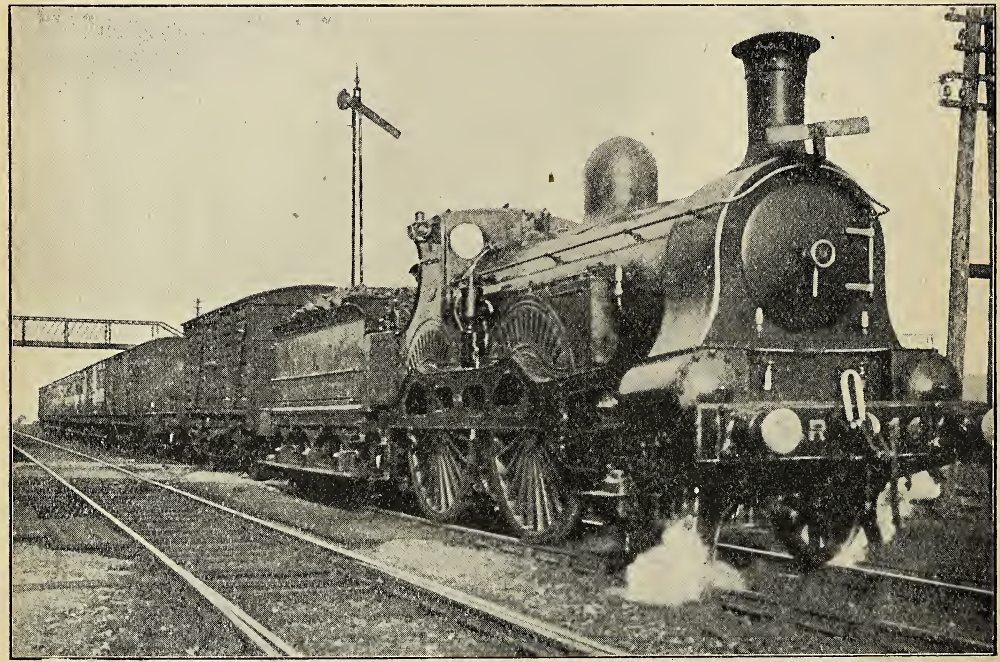
The locomotive, carriage and wagon department gives employment to 7,641 workers, and its expenditure exceeds £961,400 per annum.

The following are particulars of the respective chiefs :—

Period in Service.	Name	Date of Appointment.
7 years	Robert Sinclair (resigned end of 1856)	June, 1849.
20 years	Benjamin Conner (died February, 1876)	January, 1857.
6 years	George Brittain Outdoor Loco. Superintendent	Autumn, 1870.
	,, ,, Locomotive Superintendent (resigned July, 1882)	Feb. 27th, 1876.
8 years	Dugald Drummond (resigned July, 1890)	Aug. 6th, 1882.
9 months	Hugh Smellie (died April, 1891)	Aug., 1890.
4 years	John Lambie (died February, 1895)	April 1st, 1891.
———	John Farquharson McIntosh (still in office)	Jan. 31st, 1895.



A GRAMPIAN CARRIAGE. THE NEW STANDARD TYPE OF CORRIDOR COACH, CALEDONIAN RAILWAY.



Photo] [*Mr. D. C. McBean.*

CALEDONIAN RAILWAY.
Edinburgh-Carstairs train passing Kingsknowe.

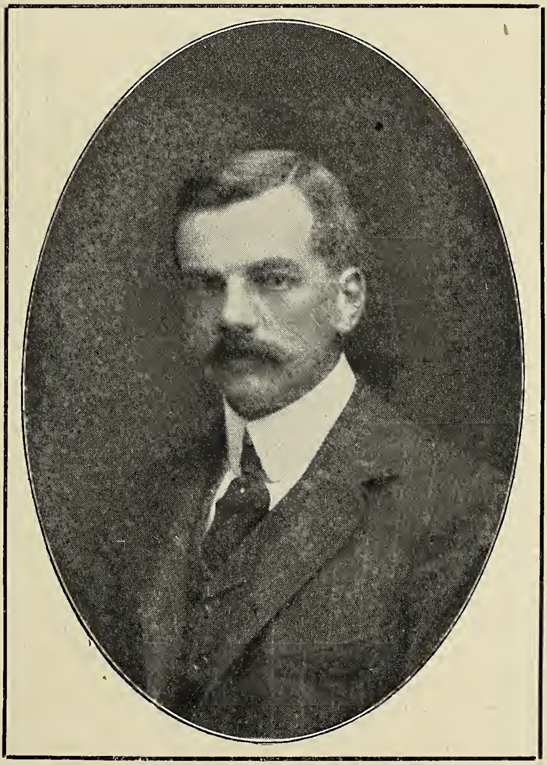
THE CALEDONIAN RAILWAY'S DIAMOND JUBILEE.

60 Years' Development of Passenger Train Services.

By G. Calthrop, *General Superintendent.*

FROM an old chronicle it appears that in the year 1818—the year that Glasgow, with its population of 100,000, first experienced the benefits of "illuminated sparkling gas"—15 public coaches left and returned to the city daily. These coaches included His Majesty's mail carriages, and their destinations embraced London, Edinburgh, Perth, Ayr, Paisley, Greenock, Hamilton, and Kilmarnock. A coach for Carlisle and another for Lanark also left and returned to Glasgow, three times a week. Fifteen coaches to accommodate the whole passenger traffic to and from a great town!!

These few stage coaches were the only means by which the public could travel to distant parts of the country, and, useful as they were, their day was then fast coming to an end, as already great activity was being shown in the promotion of railway schemes, and a few years later the last coach was consigned to oblivion; but not so its name as, unconsciously, or, perhaps, as a "sop to Cerberus," the railways annexed and applied it to designate one of their greatest departments, viz., the "Coaching Department," the development of which we are now describing.



MR. G. CALTHROP, GENERAL SUPERINTENDENT.

We have referred, not inappropriately, perhaps, to Glasgow, as the history of the "City of St. Mungo" is indissolubly associated with the progress of the Caledonian Railway, and the Company rightly claims a great part of the credit for the proud position which Glasgow has attained as the second city of the Empire.

The first Caledonian passenger station in Glasgow was situated at Townhead depot—the terminus of the Glasgow and Garnkirk Railway. The illustration on page 210 shows the primitive structure, from which five passenger trains, almost entirely composed of open carriages, left the city in summer, and four in winter, for the Garnkirk and Coatbridge direction.

At the outset (1831-32) the number of passengers dealt with at St. Rollox station amounted, approximately, to 200 per day; by 1836 the number had increased almost to 500, and continued to rise during the 18 years the station was in use. By 1849 the line had been extended by means of a tunnel to Buchanan Street, Glasgow, where passengers were conveyed in preference to Townhead.

The first "Junction" of the Caledonian Railway—Carstairs—will also ever remain an important place in the eyes of the railway world, as it was there that the first sod of the Caledonian Railway was cut. Three trunk lines of railway meet there, viz., the Carlisle Line, the Edinburgh Line, and the Glasgow Line, and the first sod of each of these lines was turned on the same day, with great ceremony and popular joy. A spade and barrow used on the interesting occasion are still preserved at Carnwath House, for some time the summer residence of Mr. Irvine Kempt, the late general superintendent of the Caledonian Railway.

Similar enthusiasm greeted the running of the first passenger train between Beattock and Carlisle on September 10th, 1847.

In view of the opening of the line, the Caledonian Railway time table, consisting of one sheet (*vide* illustration on page 212), had been issued, and under its auspices the first train run over the railway, which was driven by the late George Graham, the chief engineer of the Caledonian Railway, made the journey from Beattock to Carlisle without a hitch.

Three trains were booked, but only one in each direction carried third-class passengers, the others being reserved for the favoured first and second classes.

The fares were mentioned, and it was indulgently allowed that "children in arms unable to walk should pass on free."

The first year after the opening of the Garnkirk Railway — 1832 — the total revenue amounted to £6,476, including the carriage of goods and mineral traffic, and of this it may be estimated that the passenger revenue did not exceed £2,000.

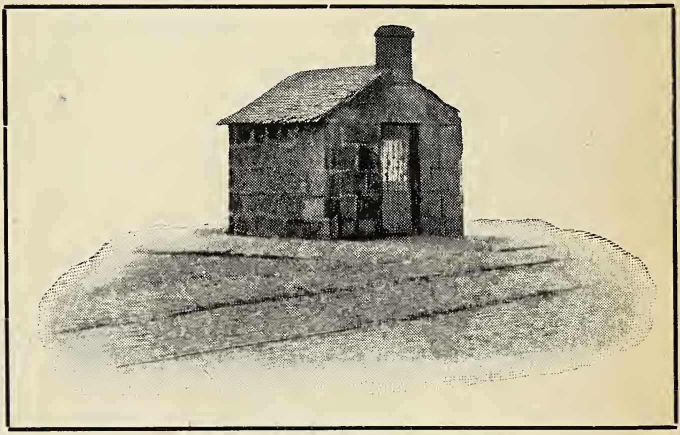
By 1849 the revenue from passenger traffic of the Caledonian Railway alone amounted to £104,792. In 1859, 522 season tickets, all told, were in operation, and the total coaching revenue amounted to £253,490. In another 10 years 6,983 season tickets were in use during the year, and the passenger traffic revenue rose to £633,127, while the number of passengers carried was almost nine millions. In 1879 the number of season ticket-holders totalled 12,821, over 13 million ordinary passengers were carried, and the total coaching revenue came to £890,985. In 1889 over 22 thousand season tickets were in use, and 19 million passengers were carried, while coaching revenue totalled £1,047,412.

During the year 1906 the season tickets numbered 65,657, and over 40 million ordinary ticket-bearing passengers were carried, while the revenue amounted to £1,654,790.

The resolution of the directors in the early 'seventies' to bridge the river Clyde at the Broomielaw, and create a great terminal station at Gordon Street, where all the South, East and West Coast going trains could be concentrated, was, perhaps, the most important step ever taken in the history of the Caledonian Railway.

The cost ran up to one million, but the shareholders have no reason to regret the result.

A few figures to illustrate the growth of traffic at the Central station will provide food for reflection :—



GLASGOW'S FIRST STATION : TOWNHEAD.

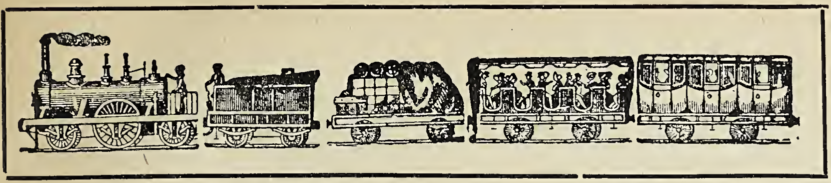
Central Station, Glasgow.

(Working with 8 platforms.)

Year.	Number of Trains Daily.	Total Number of Passengers using Station per annum.
1880	173	4¾ million
1884	180	6¼ ,,
1888	300	9¼ ,,
(Working with 9 platforms.)		
1889	338	10 ,,
1893	374	13½ ,,
1897	486	15¾ ,,
1901	476	16¾ ,,
1905	512	16¼ ,,

The later figures are irrespective of the opening of the new Low Level (Central) station.

It was found, meantime, that the Central station could no longer meet the demands of



FIRST PASSENGER TRAIN RUN BETWEEN CARLISLE AND BEATTOCK, SEPT. 10, 1847.

the growing traffic, and another million of money was spent on reconstruction, so as to afford 13 spacious platforms for working.

In 1906, working with 13 platforms, about 600 trains required accommodation daily, and close on 20 million of passengers had to be handled during the year.

PASSENGER TRAIN SERVICES.

It is curious to recall that as recently as 1888 the fastest West Coast train between London and Edinburgh and Glasgow took 10 hours to do the journey, and that was evidently considered quite satisfactory.

The principal trains appearing in the table then were :—

		a.m.	a.m.	p.m.	p.m.
Glasgow (Central)	dep.	10 0	11 0	5 50	9 5
Edinburgh (Princes Street)	,,	10 0	11 0	6 0	9 10
		p.m.	p.m.	a.m.	a.m.
London (Euston)	arr.	8 0	10 15	3 50	7 0
		a.m.	p.m.	p.m.	
London (Euston)	dep.	10 0	8 50	10 0	
		p.m.	a.m.	a.m.	
Edinburgh (Princes Street)	arr.	8 0	6 55	9 25	
Glasgow (Central)	,,	8 0	7 5	9 17	

Now the same journey is accomplished with ease in 8, 8¼, and 8½ hours, notwithstanding the heavy loads carried and the difficult gradients encountered.

The principal trains now are :—

		a.m.	noon.	p.m.	p.m.	p.m.	p.m.	
Glasgow (Central)	dep.	10 0	12 0	2 0	5 55	9 5	10 45	
Edinburgh (Princes Street)	,,	10 5	12 0	2 0	6 0	9 5	10 50	
		p.m.	p.m.	p.m.	a.m.	a.m.	a.m.	
London (Euston)	arr.	6 20	8 30	10 45	3 50	6 30	7 10	
		a.m.	a.m.	p.m.	p.m.	p.m.	p.m.	p.m.
London (Euston)	dep.	10 0	11 30	2 0	8 50	9 0	11 35	11 50
		p.m.	p.m.		a.m.	a.m.	a.m.	a.m.
Edinburgh (Princes Street)	arr.	6 15	7 55	10 30	6 40	—	7 35	—
Glasgow (Central)	,,	6 15	7 55	10 20	—	6 15	—	7 50

It takes almost double the number of trains now than in 1888 to accommodate the traffic, and the speed will compare favourably with the performance on any other line here or elsewhere.

A corresponding acceleration has been achieved on the other main line services between Glasgow, Edinburgh, and Perth, Dundee, and Aberdeen. For many years one of the trains on this section occupied the place of honour for the highest booked speed in Britain. This refers to the 8 p.m. train Aberdeen to Glasgow and London, timed to run 32½ miles, Forfar to Perth, in 33 min. It is difficult even yet to find any point to point run to beat this.

A little over two years ago the Caledonian Railway placed the famous 'Grampian Corridor Train' on the Aberdeen section, and provided luncheon and dining accommodation, a facility which had long been desired on this route. The time occupied by the 'Grampian Corridor' is 3 hrs. 42 min. from Glasgow to Aberdeen, and 3½ hrs. returning.

Between Edinburgh and Glasgow, where the journey only occupies a matter of 65 min. for the 46½ miles, the Caledonian express service is much admired.

On the Coast routes between Glasgow, Gourock, Wemyss Bay, Ardrossan and Balloch, improvements and accelerations in the train service have been planned and carried out from season to season, until now one would almost think the service was perfect. There is no doubt that the splendid fast trains in conjunction with the equally fine steamers provide facilities for the public, not to be seen away from the Clyde.

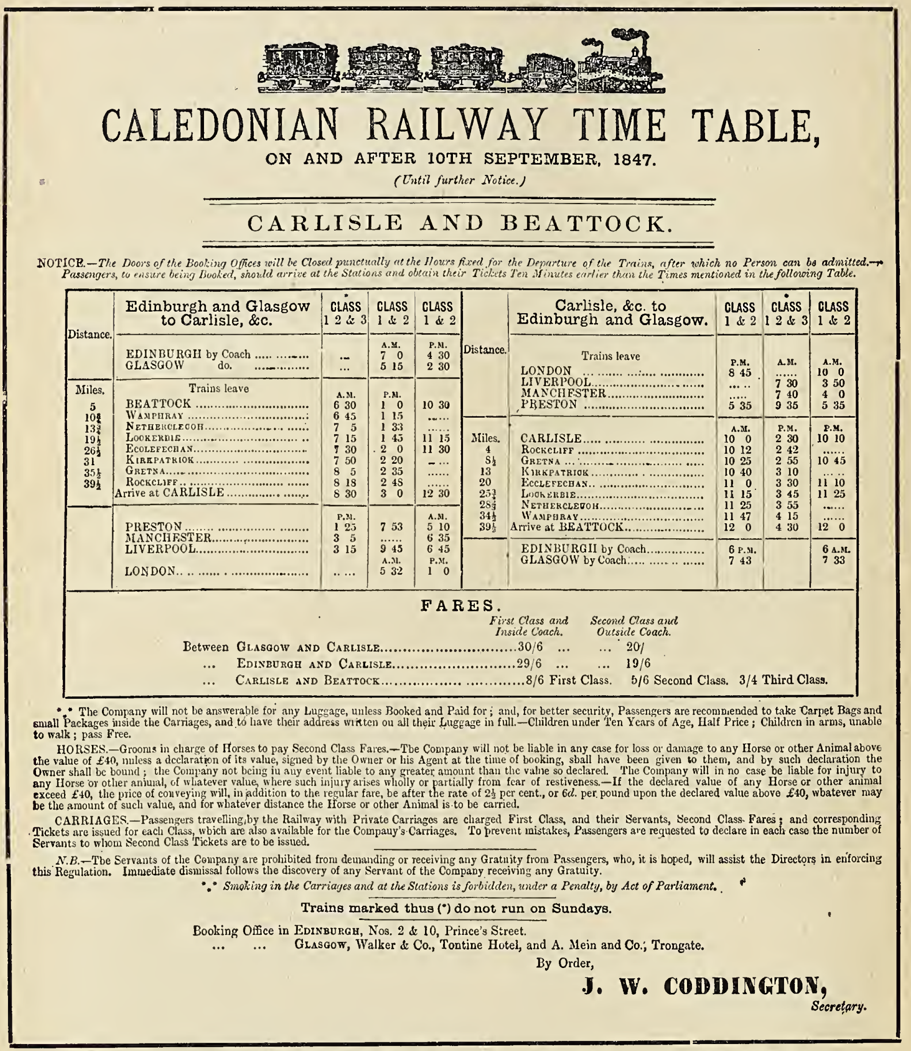
Recently, also, the time table was revised to greatly shorten the journey between

Edinburgh, Glasgow and Oban, where a new summer train, christened the

"G. & O. Hotel Express,"

is one of the popular features. It reduces the journey from Glasgow to Oban to 3½ hrs.

Practically the same tale could be told of almost every section of the line where it is possible to develop a traffic, but so much has been said on the subject in The Railway Magazine from time to time that it is not necessary to labour it further.



CALEDONIAN RAILWAY TIME TABLE,

ON AND AFTER 10TH SEPTEMBER, 1847.

(Until further Notice.)

CARLISLE AND BEATTOCK.

NOTICE.—*The Doors of the Booking Offices will be Closed punctually at the Hours fixed for the Departure of the Trains, after which no Person can be admitted.—Passengers, to ensure being Booked, should arrive at the Stations and obtain their Tickets Ten Minutes earlier than the Times mentioned in the following Table.*

Distance.	Edinburgh and Glasgow to Carlisle, &c.	* CLASS 1 2 & 3	CLASS 1 & 2	CLASS 1 & 2
	EDINBURGH by Coach	..	A.M. 7 0	P.M. 4 30
	GLASGOW do.	...	5 15	2 30
Miles.	Trains leave	A.M.	P.M.	
5	BEATTOCK	6 30	1 0	10 30
10¾	Wamphray	6 45	1 15	......
13¾	Nethercleugh	7 5	1 33	......
19½	Lockerbie	7 15	1 45	11 15
26½	Ecclefechan	7 30	2 0	11 30
31	Kirkpatrick	7 50	2 20	— ...
35½	Gretna	8 5	2 35	......
39½	Rockcliff	8 18	2 48	......
	Arrive at CARLISLE	8 30	3 0	12 30
	PRESTON	P.M. 1 25	7 53	A.M. 5 10
	MANCHESTER	3 5	......	6 35
	LIVERPOOL	3 15	9 45	6 45
	LONDON	.. ...	A.M. 5 32	P.M. 1 0

Distance.	Carlisle, &c. to Edinburgh and Glasgow.	CLASS 1 & 2	* CLASS 1 2 & 3	CLASS 1 & 2
	Trains leave			
	LONDON	P.M. 8 45	......	A.M. 10 0
	LIVERPOOL	... ..	A.M. 7 30	3 50
	MANCHESTER	.....	7 40	4 0
	PRESTON	5 35	9 35	5 35
Miles.	CARLISLE	A.M. 10 0	P.M. 2 30	P.M. 10 10
4	Rockcliff	10 12	2 42	......
8½	Gretna	10 25	2 55	10 45
13	Kirkpatrick	10 40	3 10	... ..
20	Ecclefechan	11 0	3 30	11 10
25¾	Lockerbie	11 15	3 45	11 25
28¾	Nethercleugh	11 25	3 55	......
34½	Wamphray	11 47	4 15	......
39½	Arrive at BEATTOCK	12 0	4 30	12 0
	EDINBURGH by Coach	6 P.M.		6 A.M.
	GLASGOW by Coach	7 43		7 33

FARES.

	First Class and Inside Coach.	*Second Class and Outside Coach.*	
Between Glasgow and Carlisle	30/6	20/	
... Edinburgh and Carlisle	29/6	19/6	
... Carlisle and Beattock	8/6 First Class.	5/6 Second Class.	3/4 Third Class.

⁂ The Company will not be answerable for any Luggage, unless Booked and Paid for; and, for better security, Passengers are recommended to take Carpet Bags and small Packages inside the Carriages, and to have their address written on all their Luggage in full.—Children under Ten Years of Age, Half Price; Children in arms, unable to walk; pass Free.

HORSES.—Grooms in charge of Horses to pay Second Class Fares.—The Company will not be liable in any case for loss or damage to any Horse or other Animal above the value of £40, unless a declaration of its value, signed by the Owner or his Agent at the time of booking, shall have been given to them, and by such declaration the Owner shall be bound; the Company not being in any event liable to any greater amount than the value so declared. The Company will in no case be liable for injury to any Horse or other animal, of whatever value, where such injury arises wholly or partially from fear of restiveness.—If the declared value of any Horse or other animal exceed £40, the price of conveying will, in addition to the regular fare, be after the rate of 2½ per cent., or 6*d.* per pound upon the declared value above £40, whatever may be the amount of such value, and for whatever distance the Horse or other Animal is to be carried.

CARRIAGES.—Passengers travelling by the Railway with Private Carriages are charged First Class, and their Servants, Second Class Fares; and corresponding Tickets are issued for each Class, which are also available for the Company's Carriages. To prevent mistakes, Passengers are requested to declare in each case the number of Servants to whom Second Class Tickets are to be issued.

N.B.—The Servants of the Company are prohibited from demanding or receiving any Gratuity from Passengers, who, it is hoped, will assist the Directors in enforcing this Regulation. Immediate dismissal follows the discovery of any Servant of the Company receiving any Gratuity.

⁂ *Smoking in the Carriages and at the Stations is forbidden, under a Penalty, by Act of Parliament.*

Trains marked thus (*) do not run on Sundays.

Booking Office in Edinburgh, Nos. 2 & 10, Prince's Street.
... ... Glasgow, Walker & Co., Tontine Hotel, and A. Mein and Co., Trongate.

By Order,

J. W. CODDINGTON,
Secretary.

Facsimile OF THE FIRST TIME TABLE ISSUED BY THE CALEDONIAN RAILWAY. SIZE OF ORIGINAL, 11″ × 9¾″.

It must not, however, be overlooked that to the West Coast route belongs the credit of the fastest long run in this country. This is 541 miles in 512 min., which was accomplished on August 22nd, 1895, by the Caledonian Railway's tourist express running from Euston to Aberdeen in 8 hrs. 32 min.

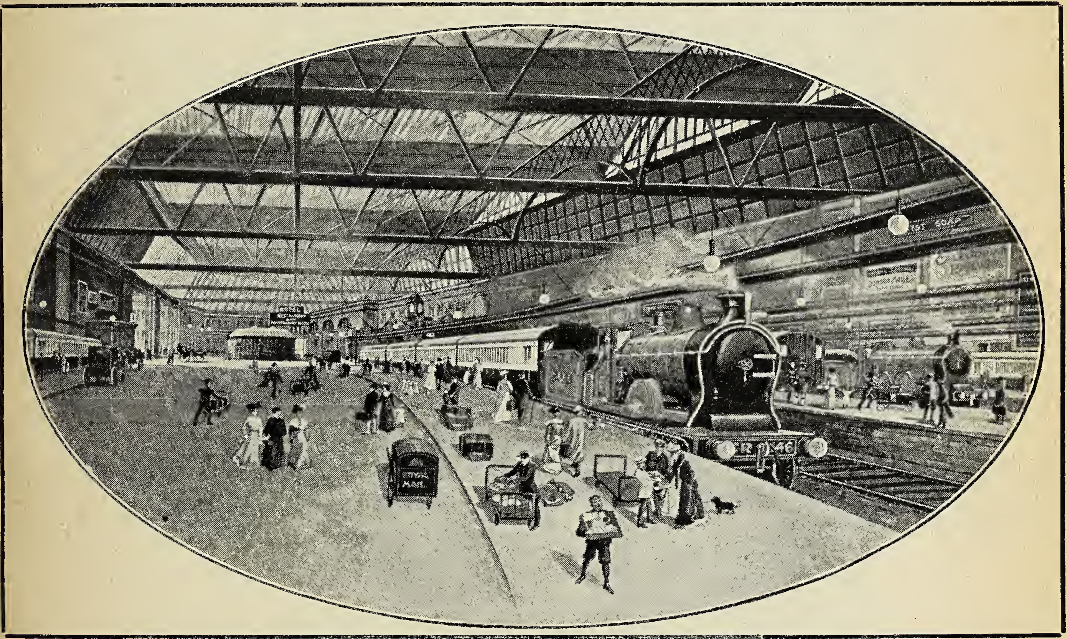
In addition to the working of the passenger trains, two other very important matters are dealt with in the General Superintendent's offices; these are the parcels traffic and the advertising of the railway.

The Parcels Department.

Not the least important of the various departments of a railway, from a revenue-earning point of view, is the parcels department, under which heading is included in addition to parcels proper, everything (except passengers) that is carried by passenger train — horses, dogs, carriages, milk, live stock, fish, fruit, etc.; and, since the commencement of the Caledonian Railway, the development of the parcels traffic has been steadily maintained from year to year, until at the present time it is a very large and valuable one to the railway; in fact, it may be said that no other source of revenue has shown more steady progress than that accruing from the parcels traffic.

The following interesting figures will give an idea of its growth since the year 1850:—

Year.	Receipts.
1850	£5,376
1860	£18,342
1870	£58,429
1880	£98,826
1890	£160,085
1900	£236,697
1906	£311,080



GLASGOW EXPRESS LEAVING PRINCES ST. STATION, EDINBURGH.

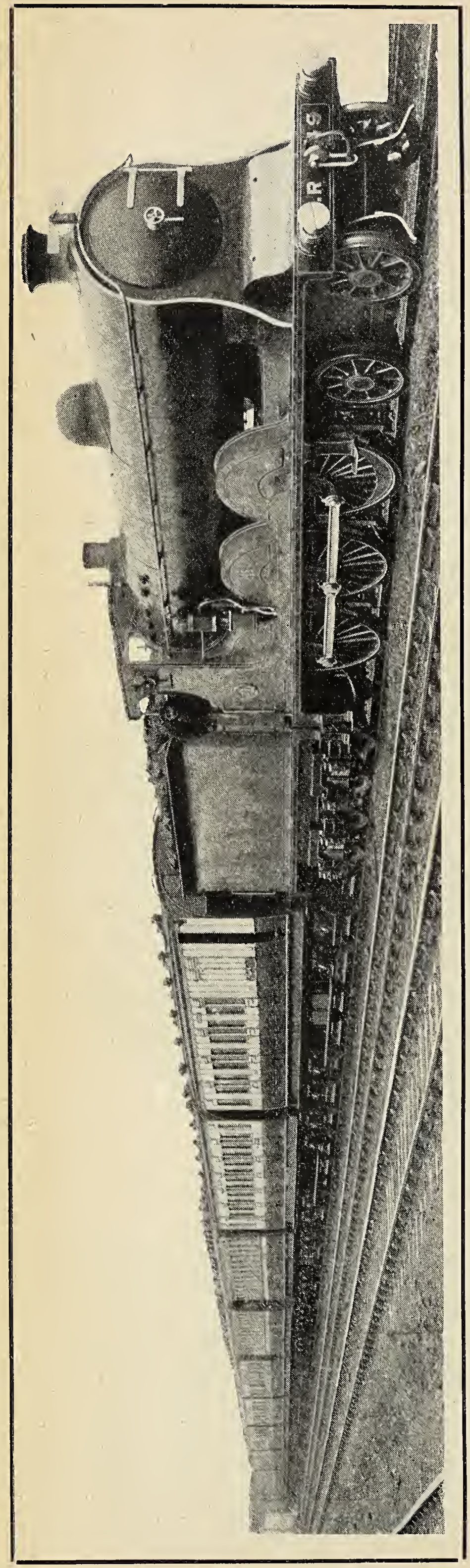
It might have been expected that, with the advent of the Parcel Post in August, 1883, the Caledonian Railway's parcels traffic would have been seriously affected, as it was anticipated that the bulk of the small parcels would fall into the hands of the Post Office; but, as a matter of fact, the receipts for the year 1884 maintained the same steady increase as in previous years, showing that the Parcel Post partly created a new traffic, and also helped to popularise and develop the forwarding of parcels.

The principal parcels office of the railway in Glasgow prior to the opening of the Central station was at Buchanan Street station, and in 1876 the parcels staff consisted of eight clerks, three porters, and four deliverers, whilst the staff now employed at the new parcels office in Hope Street numbers over 100.

With the opening of the Central station, in 1879, the principal parcels office was transferred to the premises in Union Street, with connection to the station; but, before many years had passed, it was found that the space was quite inadequate to deal with the ever-increasing traffic, so that it was a great relief when in May, 1904, the present splendidly equipped office, with an area of 6,000 sq. yds., as compared with 500 in the Union Street office, was opened.

A special feature of this office is the provision made for the traffic being expeditiously dealt with and conveyed to the various platforms by means of underground passages and a series of hoists. It is lit with electric light, and no expense has been spared to provide every facility for the working of the traffic, with the result that it is, without doubt, the finest parcels office in the Kingdom.

The number of parcels dealt with at the Glasgow Central parcels office for the year 1883 was under half a million, whilst for the year 1906 the traffic had increased to over two and a quarter millions. This, however,



WEST COAST DINING CAR TRAIN, HAULED BY CALEDONIAN RAILWAY LOCOMOTIVE NO. 49.

does not give anything like an idea of the actual parcels traffic handled, as all traffic weighing over 2 cwt. is included under the heading of "Miscellaneous," which, during the year 1906, amounted to no less than 13,256 tons. There is also an enormous quantity of newspaper parcels carried under the "label" system and under "contract" not included under the foregoing figures, also about a million parcels from other stations which are sent to Glasgow Central for transfer; so that, roughly speaking, not less than four and a half million parcels are handled in the course of a year by the parcels staff at the Central station.

As the bulk of the traffic arriving for delivery in the city is urgently wanted by the merchants, the staff, from an early hour in the morning, are busily engaged sorting it out for the delivery vans, and it is nothing unusual in the busy season for 50 to 60 lorries and vans to leave before 9 o'clock heavily laden with all kinds of goods for the various districts in the city. In addition to this, large numbers of parcels are sent by train to the suburban stations for delivery. In this connection it may be stated that the Caledonian was the first railway in Scotland to introduce a motor van for the delivery of their parcels.

The revenue derived from the conveyance of newspapers, periodicals, etc., amounts to about £16,000 per annum, whilst from excess luggage, bicycles, perambulators, etc., the receipts last year were £15,000. The earnings from cloak-room luggage were £6,000, and from lavatories over £4,000.

Parcels traffic is dealt with at all stations on the system, although at the majority of them a special staff is not required, the ordinary station staff being sufficient to cope with it. This, of course, does not apply to such places as Edinburgh, Aberdeen, Dundee, Perth, etc., where traffic is very heavy and where special offices and staff are provided

For the convenience of senders, numerous parcel receiving agencies have been established all over the country, and, as an illustration of the progress in this direction, it may be mentioned that there are now about 300 of these agencies in Glasgow, whereas 30 years ago there were only three.

The accounting necessarily involves a large amount of work, and, with the object of reducing the clerical labour to some extent, the Caledonian Railway some years ago introduced the system of stamping their local parcels with adhesive value labels, instead of sending a waybill with each, and the experiment has proved highly satisfactory, more particularly in offices where there is a large parcels traffic.

The Caledonian Railway endeavour to give every facility to traders for the prompt dispatch of their goods from one centre to another, and the conveyance of fish from Aberdeen to London affords a striking example. A special train leaves the "granite city" daily at 2 p.m., running at express speed and arriving at Broad Street station, London, at 3.20 a.m. the following morning, enabling senders to have the fish delivered and ready for sale at Billingsgate Market between 4 and 5 a.m. During 1906 thousands of tons of fish were carried by Caledonian Railway's passenger trains to all the principal towns in the country. For the supply of the Glasgow Market with fish caught in the Firth of Forth, a special train is also run daily from Granton to Gushetfaulds station, where lorries are in waiting, and within a few minutes after its arrival the traffic is on the way to the fish market to be offered for sale shortly after 8 a.m.

Special trains conveying milk are run from the country districts to the various towns, and in the summer months special trains are also requisitioned to convey the fruit from the Clydeside district to Glasgow in time for the morning market.

The strawberry traffic from the south and west of England to Scotland has now assumed such proportions that it is necessary, while the traffic is passing, to run a special train daily by the West Coast route to Glasgow. Handle baskets are used for the conveyance of the fruit, and these are loaded in vans specially shelved to prevent the berries being damaged.

The great reductions which have been made in the parcels rates during the past 40 years, and the reduced rates which the railways have granted from time to time for the conveyance of certain commodities, enabling farmers, produce growers, butchers, fish merchants, etc., to send their produce to the best markets in the kingdom at reasonable rates, have no doubt had an important bearing on the development of the parcels traffic.

MOTHERWELL STATION ON THE JUNE HOLIDAY, 1907.

With the telephone gradually coming into more extensive use, and an inclination on the part of tradespeople in the vicinity of large towns to keep small stocks, purchase oftener, and in small quantities, there seems to be no limit to the development of the parcels traffic by passenger train, and there is no reason to doubt that the Caledonian Railway, as in the past, will keep abreast of the times and do everything possible to maintain and foster this class of traffic

THE CALEDONIAN RAILWAY'S DIAMOND JUBILEE.

The Development of Railway Advertising.

By Jno. Mason, *Chief of Time Table Department.*

FROM its infancy the watchword of the Caledonian Railway in the matter of advertising has been "forward." As early as 1849 we find the railway advertising by hanging card as under :—

GREENOCK TO EDINGURGH,
without change of carriage,
via the Clydesdale Junction and Caledonian Railways.
Trains leave Greenock at
9.15 a.m.
3.30 p.m.
6.30 p.m.,
and
Trains leave Caledonian Railway station, Edinburgh, at
7.15 a.m.
11.30 a.m
4.0 p.m.
Passengers can be booked at Edinburgh for Paisley, Port Glasgow, and Greenock.
Fares :—10s. 6d., 8s., and 5s. 8d.

We reproduce on this page an 1852 example of this same policy, showing the desire of the Caledonian Railway to suit the public convenience, and at the same time to encourage business.

Growth in business is always an interesting subject, but in our times there is much to retard the development of railway undertakings (bad weather and Municipal tramway extensions, as examples).

The "man in the street" has the idea, and he is undoubtedly right, that commerical concerns which do not advertise attractively and extensively, fail to do so on account of a diminished turnover, but it is not the slightest use having something good for the public if the expense and trouble of saying so are not resolutely faced from the outset.

It is evident that the Caledonian Railway realises these facts now, as 60 years ago, and the progress which has been made by the railway in the advertising world is worthy of all commendation.

As a means of making known to the travelling public the "beauty spots" of the railway system, the picture poster offers unrivalled facilities. Besides being more interesting than ordinary printed matter, however attractively displayed, a picture has

CALEDONIAN RAILWAY.

GREENOCK, HAMILTON, AND BARRHEAD SECTIONS.

SUMMER ARRANGEMENTS.

ON and after 15th APRIL next the following Arrangements for PASSENGER TRAFFIC on the above Sections of the Line will commence—

FROM GLASGOW TO GREENOCK.
7, 8, 9, 10, 11 A.M., 12, 1, 2, 3, 4, 5, 6, and 7 P M.

FROM GREENOCK TO GLASGOW.
5.30, 7.30, 8.45, 9.15, 10.30, 11.30 A.M., 12.30, 2.30, 3.30, 4.30, 5.30, 6.30, and 7.15 P.M.

The 9.15 A.M. Up Train and the 4 P.M. Down Train being Express, are expected to run through in 45 Minutes, the other Trains in an Hour.

Arrangements have been made with some of the Steam-boats, which will secure a continuous communication between Glasgow and Paisley, and the Towns on the Coast several times a day, the particulars of which will appear in a future advertisement.

FROM GLASGOW TO HAMILTON.
8, 9, AND 11 A.M., 1, 3, 5, 6.30, AND 8.30 P.M.

FROM HAMILTON TO GLASGOW.
9, 10 A.M., 12, 2, 4, 6, 7.30, AND 9.15 P.M.

FROM GLASGOW TO BARRHEAD,
7.30 AND 10 A.M., 12, 2, 4.30, 7, AND 9 P.M.

FROM BARRHEAD TO GLASGOW,
9 AND 11 A.M., 1, 3.30, 5.30, 8, AND 9.45 P.M.

On these three Sections RETURN TICKETS will be issued every Lawful Day, at a Fare and a Half, to and from every Station (except between Glasgow and Paisley). The Return Tickets issued on Saturday being available also on Monday.

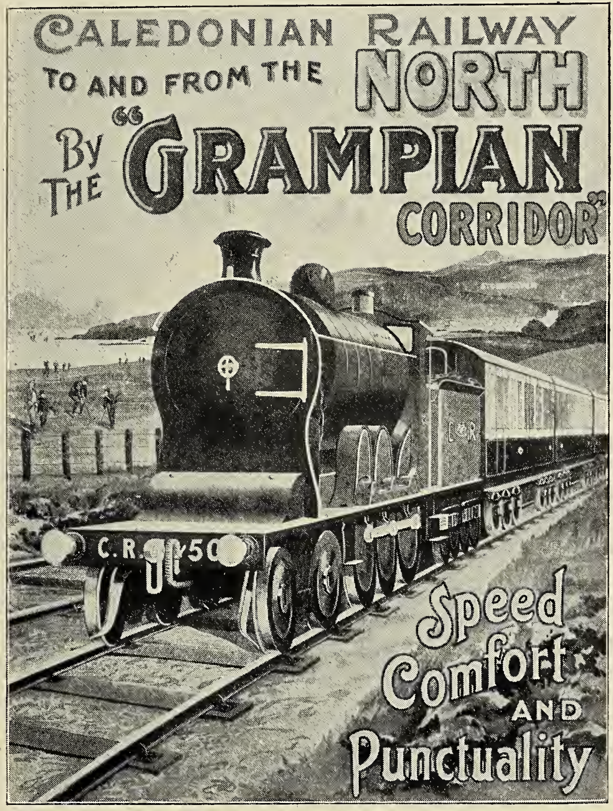
If any alteration is required in these Trains to suit general convenience, the Public may rely that the above amount of accommodation will not be curtailed, and this early intimation is given to facilitate families making their arrangements for the Summer.

Trains to accommodate the Uddingston Passengers are in progress of arrangement, and will be notified when completed. Also frequent Excursion Trains during the Summer on all parts of the Caledonian system of Railways.

By Order.
J. W. CODDINGTON, Secy.
Company's Office, March 8, 1852.

a great advantage, in that it can be read at a glance and at a distance. A further important advantage which the picture poster enjoys over the plain type announcement lies in the fact that a *good* picture has the power to compel attention, and leave one favourably impressed almost before the message which it is intended to convey has been assimilated.

Three years ago, when the Caledonian Railway introduced the now famous and ever-popular "Grampian Corridor" trains on the Glasgow, Edinburgh and Aberdeen service, it was necessary that the trains should be made as widely known as possible, and the success which attended the efforts of the railway in this direction are worthy of praise, for it is an undoubted fact that there are no better known trains in the British Isles. The pictorial poster did its work well in furtherance of this all-important object, and the accompanying reproduction of one of the two posters issued speaks for itself. Both bills were printed in the actual colours, the large size giving a broadside view of the train, and the small size (reproduced on this page) a head view. The latter was exhibited on the Caledonian Railway's own advertisement boards, and the eight-sheet bill on the public hoardings, so that visitors to almost every town and village from Land's End to John o' Groats had the pioneer of Scottish corridor trains *de luxe* brought to their knowledge in a most pleasant and attractive fashion. Both do credit to the artists and printers.



ONE OF THE STRIKING "GRAMPIAN" PICTURE POSTERS.

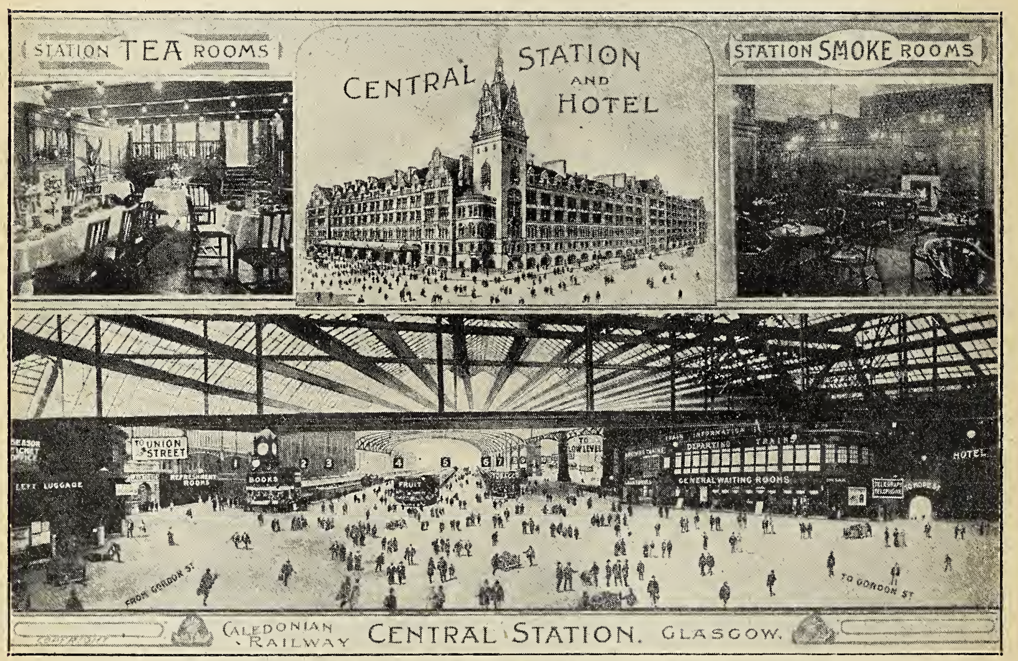
The railway did not rely entirely on poster bills to boom the "Grampian" trains, however, and with characteristic energy placed about three million bookmarkers into the hands of the British public through the medium of magazines, circulating libraries, etc., etc. Commenting on the bookmarkers we (The Railway Magazine) said :—

"The best bookmarker we have seen is one issued by the Caledonian Railway, which contains just the kind of information that delights the heart of *railwayacs*, and cannot fail to interest travellers on the Caledonian Railway. On one side of the bookmarker is an excellent reproduction of the Grampian express passing the Stonehaven golf course, whilst on the reverse is a gradient profile of the Caledonian Railway from Carlisle to Glasgow, showing the respective heights of Carlisle, Beattock summit, and Glasgow above sea level. A table to show speed of trains, method to calculate same, and particulars of the longest and fastest runs on the Caledonian Railway are also given. This information cannot fail to be an excellent advertisement. The traveller will naturally be interested to know at what speed the heavy train will ascend the formidable Beattock bank, and by means of the speed table and his watch he will be able to find this out during

> the ascent. So powerful are the Caledonian Railway's locomotives, that passengers cannot fail to be impressed by the feat performed, and to talk about it to their friends when relating incidents connected with the journey."

This bookmark is still to be found in many a home as a cherished souvenir of the owner's journeyings over the Caledonian Railway.

The progress made by the Caledonian Railway in pictorial advertising is well exemplified by a strikingly effective poster, at present shown on the public hoardings. It stands alone in the railway world in this country in regard to its size, which is 120 in. by 160 in., while, as regards design and lithographing, it may be said to be well-nigh faultless.



A PICTURE POSTER GUIDE TO THE GLASGOW CENTRAL STATION.

The poster has been printed for the purpose of attracting visitors to the Clyde and Arran coast resorts. The body of the picture is a representation of a view of Brodick, and shows the charming village nestling at the foot of the purple-clad Arran hills ; the dark green of the firs, the white, fleecy clouds, the yachts in the bay, and the children playing on the sands, completing a most delightful picture of the favourite resort. An inset shows a pretty sunset scene, every detail of the departing fishing fleet as it appears against the sinking sun being shown up with fine distinctness ; while a second inset portrays the bustling animation of the new Central station, Glasgow, just prior to the departure of a Coast express.

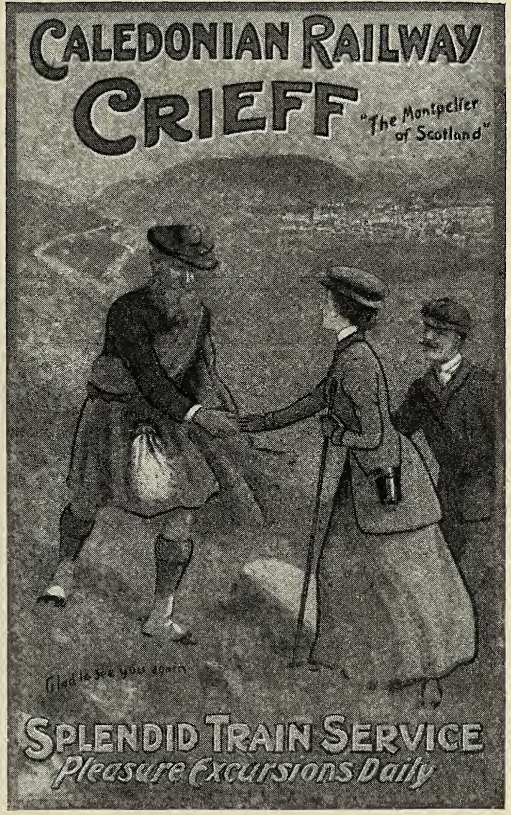
This poster adorns the garden wall of at least one of the homes of "Merrie England," on a board erected for its exhibition in a secluded corner.

So great has been the demand for these pictures that the railway has been compelled to make a nominal charge for them. The large bills are being sold at 2s. 6d. each ; the smaller size at 1s. 6d., and the hanging cards at 6d.

Space will not admit of detailing the many other interesting pictures issued by the railway within the last year or two, but these notes would be incomplete if reference was not made to the telling bill setting forth the attractions of Crieff as a summer holiday resort. This poster recalls reminiscences of previous holidays in the Highlands, and at the same time conveys the suggestion that the Scotsman is always "glad to see" his English tourist friends again.

We have already referred to the work done by the bookmark in "booming" the "Grampian" corridor trains, but the Caledonian Railway has had a much wider field of usefulness for this form of advertising novelty

About a dozen different kinds of bookmarks have been issued by the Company within the last few years, but two of these stand out by themselves. The latest issue is titled "Bonnie Scotland" bookmark (illustrated on page 220) and is, perhaps, the finest work of the kind put out by any railway. It is printed by the tri-colour block process. Three views are shown on one side, viz., Silver Strand, Loch Katrine; the "Grampian" Corridor Train passing Stonehaven; and Alloway Kirk, Ayr, while on the other side is a most effective advertisement of "The Homes and Haunts of Scott and Burns," a new booklet just issued by the Company. The other bookmark—also in colours—shows a picture of Brodick Bay—really a miniature of the large "Clyde Coast and Arran Resorts" poster—on the back of which is a calendar for the year, a view of the interior of Glasgow (Central) station, and other useful information regarding the availability of tickets by the West Coast route.



REDUCED *facsimile* OF THE CALEDONIAN RAILWAY'S "GLAD TO SEE YOU" PICTURE POSTER.

Another feature of importance which occupies a great deal of thought, time, and attention in the advertising department, is the issue of useful and attractive guide books. The motto followed here is "Don't be content to share traffic with another, but create it—make business that does not exist."

Some of the guides are of a general character, such as the "Tourist Programme" and "Through Scotland," whilst in others certain districts are specialised; chief amongst these being "Oban and the Land of the Gael" and the "Homes and Haunts of Scott and Burns." The latter booklet has just recently been published, and until now its circulation has been chiefly confined to the land of "Cousin Jonathan." It is printed on tinted paper, with white border, and is really a magnificent production, alike as regards the letterpress and the pictures.

Although the fact is not so well known as is desired, there is hardly a spot in Scotland over which the genius of these poets have cast a splendour or a spell, to which one may not travel now in one of the magnificently-equipped carriages of the Caledonian Railway. The book shows that there could hardly be a more memorable pilgrimage than that to the homes and haunts of Scott and Burns.

"Oban and the Land of the Gael" is got up in an entirely original manner, and describes, in delightful fashion, one of the most interesting parts of the Highlands, rich in ancient historical lore, and unequalled in beauty.

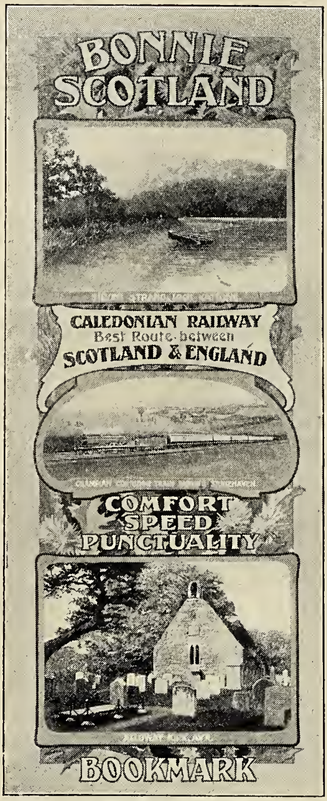
Two publications dealing specially with the Clyde coast are also worthy of notice. These are the "Official Guide to the Firth of Clyde" and "Holidays on the Scottish Fiords." The latter is an entirely new production, running into 30 pages, and, besides giving much useful information regarding the price of tickets, travel facilities, etc., is intended to convince Englishmen that the Clyde coast has charms not to be met with at so-called popular English watering-places.

The Caledonian Railway is also responsible for the issue of a tourist map of Scotland. The map, which is printed in three colours, is enclosed in folding leather covers, and when folded can easily be slipped into the waistcoat pocket.

There has been an extraordinary demand

for the map, and it is just possible that its neat appearance, handy size, and artistic cover, not to mention the useful information on the back of the map, may have conduced to its popularity.

The value of the "Post-card" as an advertising medium was early recognised by the Caledonian Railway, and it is now five years since the first series made their appearance. These all showed views of places of interest on the Caledonian Line. They were printed from half-tone blocks in black and white, and had a fair run of success for the first two years. Public taste was beginning to favour the coloured card, however, and arrangements were made in 1905 to put 17 sets—each set containing six cards in colours—on the market. These cards—the finest yet used by any railway—met a ready sale at 3d. per packet, and by the end of the season a number of the sets had to be reprinted again and again. In 1906 a further extension of the series was made, and the supply was practically run out by the end of the year. The 1907 edition is before the public at the present time, and, so far, the result has been very satisfactory indeed. The Caledonian Railway has now 43 complete sets, comprising no fewer than 274 cards, as well as 35 single cards—309 in all.



"BONNIE SCOTLAND" BOOKMARKER.

The new edition contains the familiar coloured card, as well as a number of "glosso" coloured and "glosso" black and white views.

It goes without saying that a great deal of time and thought was expended in getting photographs taken, and afterwards making the most careful selection of views, but the General Superintendent has seen a most happy consummation of his efforts to meet the public fancy.

The unique feature about this form of advertising is that it is obtained *without cost* to the railway; indeed, there is a small margin of profit.

The daily and weekly press has also proved to be an excellent medium for directing the attention of the public by tastefully-worded and striking advertisements. Not content with ordinary letterpress, the Caledonian Railway has gone further in adopting pictorial advertisements.

Among the least known but not less skilful ways of advertising a railway may be mentioned that of lending lantern slides of trains and places of interest to lecturers and any other responsible parties who wish to deliver lectures on Scotland or Scottish railways. The slides, which may be obtained free on application to the General Superintendent of the Company, Glasgow, are in great demand, not only in Scotland, but also in England.

"Tear off" calendars were issued by the Caledonian Railway this year; each page has two charming views of places of interest that can be reached by the Company's routes. These views are in black and white from half-tone blocks, and are varied from beginning to end of the calendars, which are hung up in offices, warehouses, clubs, hotels, etc., where people are likely to see them.

It has been said in many quarters that advertising is a decided speculation. So it is, unless carefully watched and supervised.

Success in advertising, as has been indicated, lies only in judicious propaganda, and in this respect the Caledonian Railway has, undoubtedly, and especially of late years, been amongst the most successful exponents.

* * *

The Goods Department.

By M. Waddell, *General Goods Manager.*

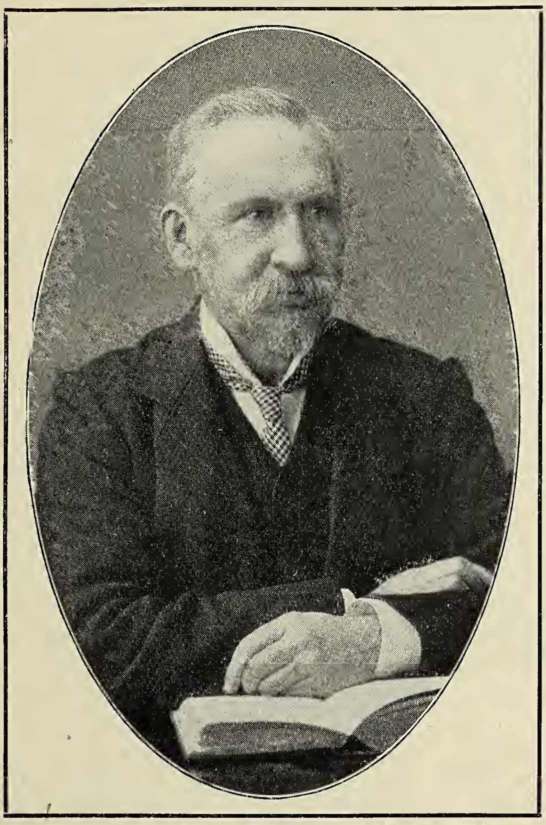
When Ruskin wrote, "Going by railroad I do not consider as travelling at all; it is merely 'being sent' to a place and very little different from becoming a parcel," it would appear that he conceded something to the utilitarian so far as goods traffic was concerned.

Whatever may be said from the sentimental and æsthetic point of view, it is obvious that the commercial prosperity of the nation is interwoven with the growth of the railway. The interests of both are indissolubly linked together, and if this were more generally recognised it might, perhaps, modify the impression that seems to pervade certain quarters that the railway is a kind of Octopus, stretching its tentacles over the country only to devour.

The railway has made possible the inception and growth of the nation's many industries, and, notwithstanding rival modes of conveyance, is still an indispensable factor in the national prosperity.

Thus the growth of the merchandise traffic of the Caledonian Railway during the past 60 years is an index to the increasing prosperity of the country since the days of packmen and lumbering carriers' carts.

Sixty years ago the merchandise revenue of the Caledonian Railway for 12 months was £120,000.



MR. M. WADDELL, GENERAL GOODS MANAGER.

In the year ending January 31st, 1907, it was £2,676,535—the greatest on record—and all down the years this has been pretty equally divided between goods and minerals.

The Caledonian Railway is largely characterised and dominated by coal and iron. Commercially, as well as geographically, its heart lies in the coalfields of Lanarkshire and Stirlingshire, and iron and steel "cuddle close" to the coal.

It is 33 years since the first steel manufacturing work was planted in Scotland. That was at Newton, on the Caledonian Railway. Since then steel manufacturing has increased to such an extent that there are now 22 works of that class connected with the railway.

Necessarily, the railway has had large demands made upon it to deal with the abnormal articles now required in the construction of the Ocean Greyhounds and the British Navy. Special vehicles have had to be constructed capable of carrying armour-plates weighing up to 40 tons, and measuring 66 ft. in length.

Railway Companies have, in most cases, found their principal stations "cribbed, cabined, and confined," necessitating the provision of marshalling yards outside the stations for the purpose, on the one hand, of collecting, assorting, and making up into trains the wagons loaded in station sheds and yards, and

THE FIRST GOODS OFFICE OF THE CALEDONIAN RAILWAY AT BUCHANAN STREET.

on the other of receiving and distributing the wagons from incoming trains. The Caledonian Railway has such yards for general merchandise at St. Rollox, Robroyston, Polmadie, Carmyle, and Mossend, in the immediate neighbourhood of Glasgow, at Fouldubs—near Grangemouth, at Gorgie and Lexmount in the Edinburgh district, and at Ross Junction and Strathaven Junction in the Hamilton district there are extensive yards for collecting and marshalling mineral traffic. These various marshalling centres can deal with 12,035 wagons.

The "Gridiron" and the "Hump" are the technical names given to the most modern style of marshalling yard — the "Hump" being the elevated part of the yard from which the wagons are run off by gravitation into and out of the sidings allocated for various descriptions and destinations of traffic, thus economising time and engine power. The Robroyston and Ross Junction yards are good examples of this class.

The "wagon question' is ever with us. Two years after the Caledonian Railway was opened the Company possessed 4,500 wagons for merchandise traffic, including 150 cattle and sheep trucks. Now there are 65,731 wagons, including 980 cattle and sheep trucks. These are supplemented by several thousands of traders' wagons, and yet there are some people (including the plant superintendent, or rolling stock controller, as he is sometimes called) who are not happy!

The laborious hand-crane is rapidly disappearing from the principal stations, and is being replaced by steam cranes for outside yard working and by hydraulic cranes for shed working. In Buchanan Street goods station there are 86 hydraulic cranes in the warehouses.

In the movement of wagons at docks and harbours the horse is giving way to the capstan. At the Caledonian Railway's extensive docks at Grangemouth there are now 120 capstans, and at Ardrossan and Glasgow Harbours much of the movement of wagons is overtaken by the same means.

The coal hoist, with inclined planes for running off empty wagons, is now the recognised equipment of every modern port. Grangemouth Docks possess eight such hoists —a contrast to the old days, when the coal

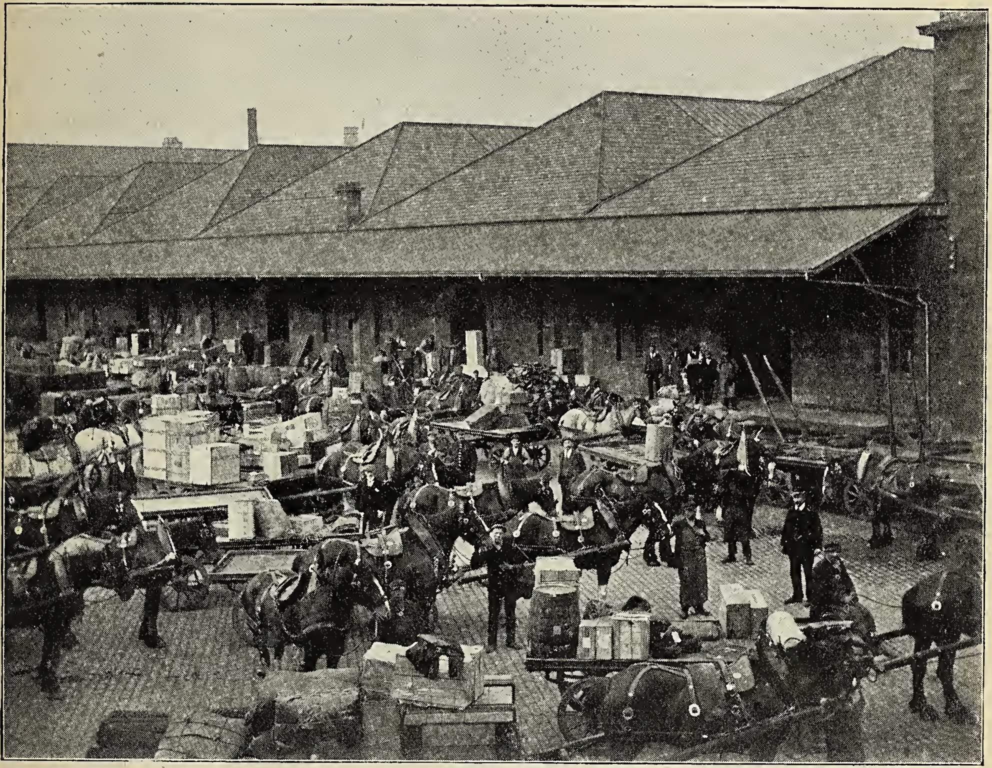
THE DWELLING HOUSE OF THE GOODS SUPERINTENDENT OF THE GLASGOW AND GARNKIRK (NOW CALEDONIAN RAILWAY), AT GLEBE STREET STATION, GLASGOW, IN 1846.

was laboriously shipped by hand. These hoists are capable of shipping 50 wagons per hour. At Ardrossan Harbour there are two, and the various Glasgow Docks are similarly provided.

Of course, at some of the smaller roadside stations the appliances and methods suitable for the larger places are not necessary or desirable, and occasionally the newspaper man pokes fun. For instance, at a small country town the local policeman was interviewed by a stranger: "When does the theatre open here?" Policeman: "We hae nae theatre here." Stranger: "Well, well, music hall, then?" Policeman: "Na, na, naething o' that kind here." Stranger: "Good gracious, my man, have you no evening amusement in this 'ere outlandish place?" Policeman: "Oh, ay! if ye wait till aucht o'clock ye'd see them shuntin' the goods train."

Reference has been made to the limitation of the goods stations in large towns. Perhaps the most remarkable instance of this is to be found in Greenock. The Greenock Line was acquired by the Caledonian Railway in 1851. The Greenock terminus is on a narrow strip of land hemmed in between the hills and the river Clyde, and is really a series of stations or depots extending for about two miles on the up and down sides of the line. The working of such a place is more than ordinarily intricate and difficult.

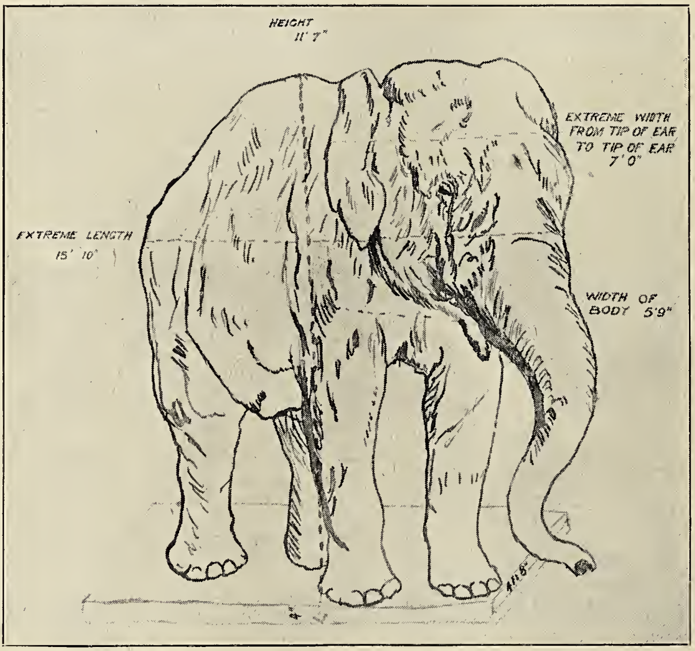
The principal goods station on the Caledonian Railway is Buchanan Street, Glasgow. It was opened in 1850. For three years previous to that the goods station was at West St. Rollox, about half a mile to the north of the present site, the only remnant of which is the old invoicing office, now occupied as a coal merchant's office.



EXTERIOR OF BUCHANAN STREET GOODS STATION, BETWEEN 5 AND 6 P.M.

On the day that the first goods station was opened at St. Rollox, the staff consisted of one clerk and some half dozen porters and checkers. There was only one vehicle in the station—an empty van. The staff anxiously waited for the first cart load, and one of them determined he would have the honour of landing the first package. When at length a cart was seen approaching the gate, he ran out, met it, shouldered the only package it contained, and, to the chagrin of his fellows, won the distinction. In the course of the day two other carts arrived, one with a cask of whisky and the other with a few small packages (there were no lorries at that time), and that constituted the first day's traffic. The hero of the first package still survives, a hale and prosperous retired Glasgow merchant.

It is interesting to note that the carting agents for the Caledonian Railway in those days were Messrs. Wordie and Company, and Messrs. J. and P. Cameron. The former are still carting contractors for the Company, and the latter act for the rival railway—the North British Railway.



WHAT RAILWAYS ARE ASKED TO CARRY!

Drawing showing dimensions of a stuffed elephant, conveyed by the Caledonian Railway.

The difference between then and now in Buchanan Street station marks in a striking way the progress of the times.

The St. Rollox station had one goods shed, accommodating about 16 wagons—now there are three, containing standing room for 263 wagons.

The packages passing through the station at St. Rollox on the opening day did not exceed half a dozen—now the average per day is 48,000.

The three carts have become something like 800 lorries per day in and the same number out, and in place of one wagon the daily arrivals and departures total up to 1,000 wagons. And all this notwithstanding the fact that there are now 10 other terminal goods stations of the Caledonian Railway in the city of Glasgow.

Of course, since 1850 the Buchanan Street station has, from time to time, been enlarged and improved to meet the requirements of the increasing business. Stores for grain, potatoes, and beer, as well as new sheds for general merchandise, have been added from time to time, covering at present about 15 acres.

It became quite evident a few years ago that at the rate at which the traffic was increasing the available accommodation within the limits of the Company's property was inadequate, and, accordingly, with the view of extending the accommodation, the Caledonian Railway purchased a large amount of property on the confines of the present goods and passenger station, including the immense buildings of the city poorhouse. This extension is being rapidly proceeded with, and when the plans are fully realised and the additional area of 18 acres occupied, it is believed the station will be second to none in Great Britain.

The other eastern terminus of the Caledonian Railway 60 years ago was Edinburgh. The Lothian Road goods station was opened in the year 1848, and it, too, has been altered and extended from time to time, and in its modern form is quite up-to-date.

At Lothian Road, in 1866, 25 wagons were received and forwarded per day; the number now is about 300, while then 20 lorries sufficed to deal with the "carted" traffic—now 300 are required.

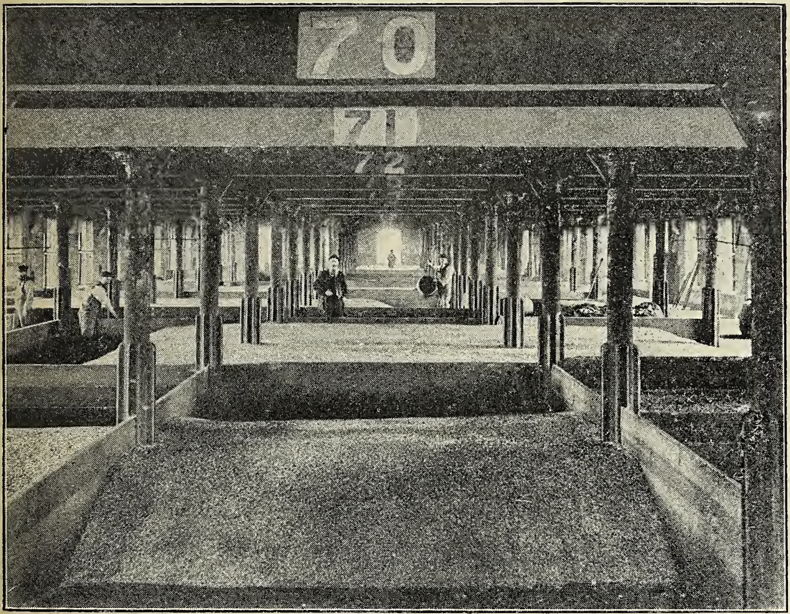
On an average 22,170 packages pass through the station daily, and 17 goods trains depart and 19 arrive with the traffic.

The brewery traffic is a special feature at this station, and 500 hogsheads have been handled in one day.

The extension of the line to Leith and Leith Docks in 1864 brought the Caledonian Railway into direct contact with the shipping companies trading to and from the Continent and other British ports.

A short time ago it was ascertained that at 17 of the principal stations on the line the average number of separate packages handled per day was 164,000, equal to 51,000,000 per annum, and it is satisfactory to know that only a mere fraction of these were lost or damaged.

A well equipped and organised goods station gives, perhaps, as fine a specimen of commercial mechanism as can be found anywhere. This has to be so, or everything would come to a standstill. In the morning there is apparent chaos; in the early afternoon decks are cleared and everything in ship-shape order—till the influx of forwarded traffic in the evening sets up a scene of animated confusion (see photo on page 223). This again, in the course of an hour melts away—leaving things in order for a fresh day's turnmoil and traffic.



INTERIOR OF THE GRAIN WAREHOUSE AT BUCHANAN STREET GOODS STATION.

The checked invoices are passed into the various down offices marked in such a way that the clerical staff can make out the delivery sheets for the various loads, and the accounts for collection from parties who do not have credit accounts with the Company. These sheets and accounts are handed to the carters, the lorries are passed over the weighing machine, and, with the safe delivery of the goods, the transaction so far is at an end. But then begins a complicated series of clerical transactions necessary for the proper accounting of the traffic, not only so far as the Company's own treasury is concerned, but also for the correct division of receipts between all the railways concerned in the case of through traffic. The limits of our space do not permit of any detailed description of these intricate clerical transactions, even if it were possible, by any amount of description, to make them clear to the uninitiated.

In so far as the forwarded or outgoing traffic is concerned, the process is, of course, reversed.

Of recent years a great improvement has been made in the loading of wagons, and much economy has been effected by some attention to what is called "scientific loading," the object being to load each wagon as fully and as neatly as possible consistent with the requirements of despatch and safety. At one or two of the principal stations the new large 30 ton wagons, measuring 48 ft. in length, have been found of great service in this respect, as they afford exceptional facilities for building a load and minimising standing room in the stations and dead weight in the trains.

Mineral traffic is, of course, dealt with in an entirely different way. The bulk of this class of traffic on the Caledonian Railway arises in Lanarkshire and Stirlingshire. Coal for shipment can generally be run in full train loads direct to the port, and import minerals can be removed in like manner, but in other cases the minerals are collected from collieries, quarries, and brick and lime works by mineral or by mixed goods and mineral trains, and assorted into train loads at the various marshalling yards already referred to.

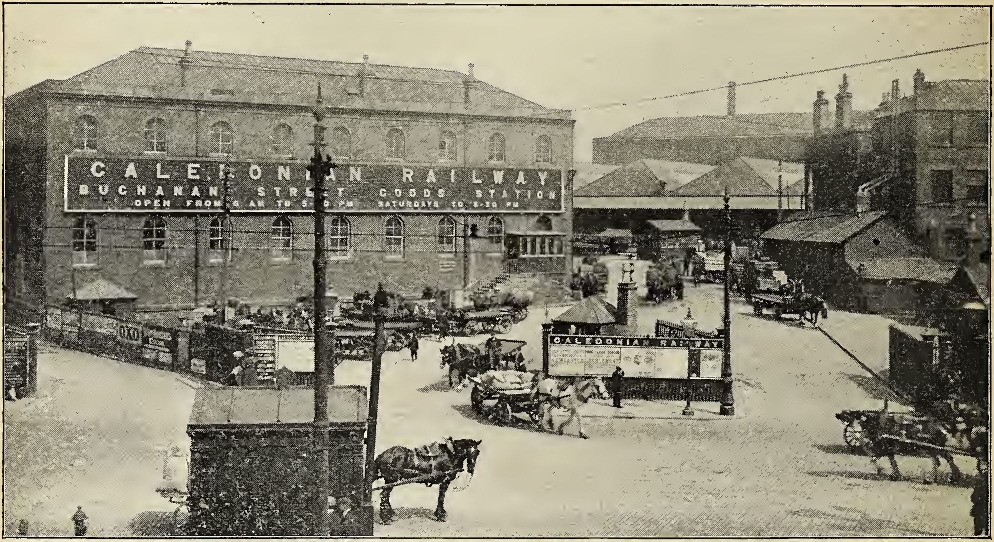
The clerical part of the business connected with the larger portion of this Lanarkshire mineral traffic is done at a central office at Motherwell, in connection with which there is a system in vogue which works with clockwork regularity day by day, and has proved to be most satisfactory. The detailed weights—gross, tare, and nett—of all the wagons which have been dealt with at some 20 weighing offices planted in the various convenient points through the Lanarkshire district are forwarded several times daily to the central office at Motherwell, where the charges are made up and the traffic invoiced to its destination. So accurately is the system carried out that it is comparatively seldom an invoice requires to be asked for by any receiving station.

Every railway has, in the course of its business, to provide for exceptional descriptions of traffic, and the Caledonian Railway has always been privileged to have men in its service who seem to have a special delight in tackling difficulties of that kind, and who do so successfully.

Sometimes an odd traffic arises which gives piquancy and a touch of comedy to the daily routine of railway working.

There is a legend on the line of a certain menagerie which had to be carried many years ago. Some of the wild beasts were accommodated in railway vehicles, no doubt because their own caravans were rather beyond the gauge. Amongst others, a lot of elephants had to be loaded into cattle trucks. The chief inspector, who told the story, took credit to himself for having managed to load his wild and boisterous cargo to perfection. The elephants had been well boarded up, but an elephant's trunk is not so easily packed, and when the strange cargo was pulled up at a station *en route*, where a passenger train was standing on the opposite line, the small boys, who were eagerly hanging half out the carriage windows to see the show, had their bonnets suddenly appropriated.

The most recent oddity in this line which the Caledonian Railway carried was a stuffed elephant of rather large dimensions, (see illustration on page 224), which had to be conveyed upon a heavy-weight trolley, although the gross weight of the "traffic" was only 26 cwts.


CALEDONIAN RAILWAY
BUCHANAN STREET GOODS STATION
OPEN FROM 6 AM TO 5 PM SATURDAYS TO 2-30 PM
OXO
CALEDONIAN RAILWAY

EXTERIOR OF THE CALEDONIAN RAILWAY'S GOODS OFFICES AT BUCHANAN STREET.

One of the interesting episodes connected with these emergency demands upon the Caledonian Railway was the conveyance of the Scottish National Red Cross Hospital equipment from Glasgow to Southampton during the war in South Africa in 1900. The hospital authorities in Glasgow received a telegram from the War Office on a certain Friday forenoon that the hospital equipment had to be at Southampton for shipment the next morning. The authorities, of course, saw that that was impracticable, inasmuch as, apart altogether from the railway journey, the various details of the hospital had to be collected from a number of places throughout the city, and it was not quite certain that everything was in readiness

However, the Caledonian Railway's officials undertook to do their very best to have the hospital at the ship's side at Southampton the following day. Lorries were despatched all over the city, every man did his best, and, in the course of a few hours, everything was in Buchanan Street station except two lorry loads, which were not ready, and in waiting for which the arrangements were very much upset. However, at length all was loaded up, and a special train of 44 wagons was despatched about 8 o'clock the same evening. It reached Southampton and was alongside the steamer the following evening. This was not quite so good as was intended, but it was better than the consignors expected, and the convener of the Hospital Committee was pleased to write: "I call the whole thing as smart a bit of work as I have seen —most creditable to all concerned."

Since then, however, such is the rate of progress, the Caledonian Railway is now receiving goods in Glasgow for despatch to London by goods train at 7 p,m. and delivering early next morning in London, or in something like 13 hours, an advance upon the expectation of an eminent Liverpool engineer, who surveyed the present Caledonian Line between Carlisle and Glasgow in 1836, and reported that the whole distance between London and Glasgow might be traversed by passenger trains in 21 hours.

The Caledonian Railway, in common with all other railways in Great Britain, had its financial revolution between the years 1889 and 1893, when the Rates and Charges Provisional Orders were being discussed and formulated.

The first rate book of the Caledonian Railway was a trifling affair, about the size of an ordinary pocket-book. The rates in which the railway is now concerned are to be numbered by millions—nobody can exactly say how many, but it now requires 495 ponderous volumes to contain them. The original classification of goods in 1847 provided for 440 articles. The present classification embraces several thousand articles.

The Caledonian Railway, as already explained under another heading of this issue of the Railway Magazine, has been gradually built up by the absorption of numerous outlying lines, every one of which had its own peculiar statutory classification of goods and powers of charging.

One good thing the revision of rates in 1892 did was to consolidate into a convenient and very brief table the charging powers of the Company; but behind that small Act of Parliament there remain memories of night and day work of a large staff of clerks and other officials for several years, a large library of huge volumes of proceedings before tribunals and Committees of Parliament, countless meetings with disaffected traders, and negotiations, often pleasant enough, but just as often otherwise; all ending in what, after all, has been fairly satisfactory to the trading community, if not to the railways. There has been, of course, a good deal of compromise, and it is only fair to say when the Caledonian Railway's officials came face to face with their principal traders they were able, in most cases, to satisfy them of the reasonableness of the changes which had to be made.

There are, of course, and always will be, parties who think that rates can never be low enough, and that changes can be made lightsomely; but it has to be kept in mind that the railways are less elastic in their money-earning capabilities than any other trading concern in the country, and that while other commercial ventures can raise prices to meet increased expenses, legislation has so fettered the railways that it is difficult, if not well-nigh impracticable, to move in that direction.

It only remains to be noted that since the beginning of the Caledonian Railway's business, 60 years ago, there have only been four general goods managers, viz.:—

From the opening in 1847 to 1856, Mr. Christopher Johnstone.

From 1856 to 1870, Mr. William Mathison.

From 1870 to 1882, Mr. (afterwards Sir James) Thompson.

And from 1882 to the present year, Mr. Archibald Hillhouse; who has just been succeeded by Mr. Matthew Waddell.

* * *

Carting Department.

By G. Robb,

Superintendent Carting Department, Caledonian Railway.

In the earlier stages of the Caledonian Railway Company's history it was, like most other companies, content to allow the services of collection and delivery of merchandise, parcels, etc., to be performed either by the traders themselves or by contractors appointed by the company.

The railway had several contractors, such as Messrs. Wordie and Company (the Pickfords of Scotland), Messrs. J. and P. Cameron (now connected with the North British Railway), Messrs. C. Robb and Company, and several others.

Messrs. Wordie and Company had been connected with the Caledonian Railway since its inception. Like their English prototype, Messrs. Pickfords, this firm dates back long before the days of railways.

The present partners, Messrs. John Wordie and Peter Wordie are the sixth generation in direct line who have carried on business. The area covered by their predecessors was that known as Foot o' Hill, round about Stirling, Falkirk, and Alloa, and Mr. William Wordie, father of the present partners, was, about 1830, carrier between Stirling and Glasgow.

In 1848, when the railway was opened between Glasgow and Stirling, all road carriers fully expected that their business was at an end, and, with the exception of Mr. William Wordie and Mr. Cameron (of J. and P. Cameron), they all resolutely began to fight the railways. Thanks, however, to the timely advice of a friend in Stirling, Mr. Wordie threw in his lot with the Scottish Central Railway, as the Stirling Railway was then called.

In addition to the Scottish Central, Mr. Wordie also obtained the carrying agency for the Edinburgh and Glasgow Railway, and thus carted for several years from both Queen Street and Sighthill (North British Railway) and from Buchanan Street (Caledonian Railway).

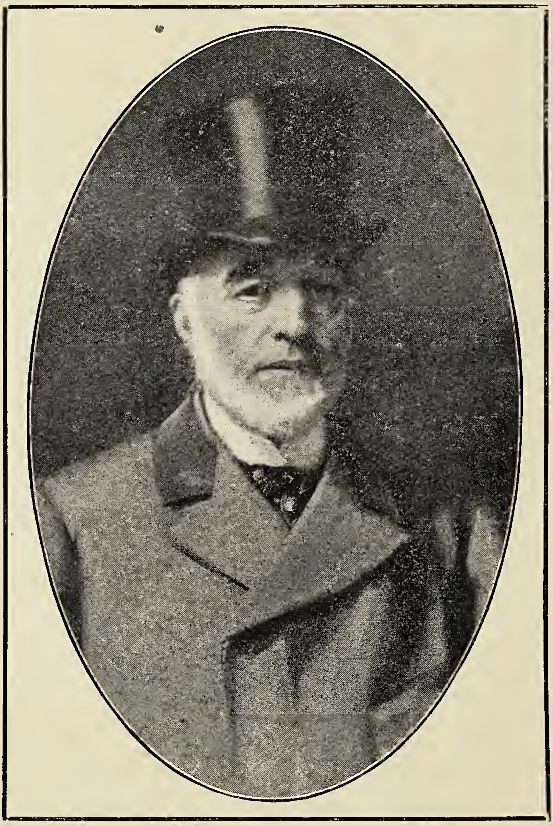
Somewhere about 1853 three of the railways working into Glasgow (Scottish Central, Edinburgh and Glasgow, and Glasgow and South-Western Railways) agreed to have one carting agent in common, but this was found to be most disadvantageous, and soon came to an end.

Up to 1865 Messrs. Wordie carted to both the Scottish Central and Edinburgh and Glasgow Railways, but about this time the Scottish Central Railway was amalgamated with the Caledonian Railway, and the Edinburgh and Glasgow Railway with the North British Railway, and Messrs. Wordie decided to throw in their lot with the Caledonian Railway, and they have no reason to regret their decision, as they have gone on steadily prospering side by side with the premier railway of Scotland.

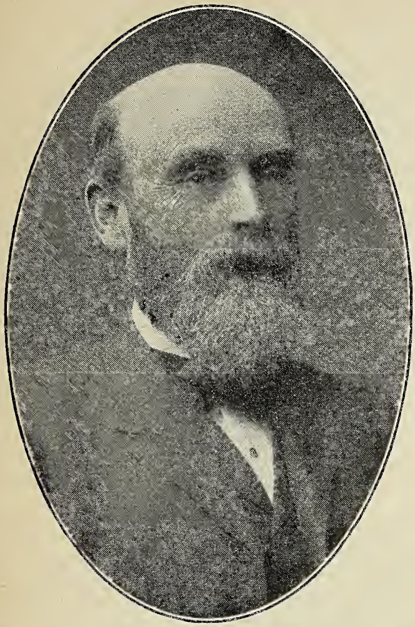
About 1853 or 1854 Messrs. Wordie also secured the contract of the Scottish North-Eastern Railway, which extended from Perth to Aberdeen, which was in later years taken over by the Caledonian Railway.

Since then the firm has continued to cart for the Caledonian Railway, and has gone on quietly increasing side by side with the railway, with which the firm's interests have always been practically identical, and the present prosperous position of the firm shows that Mr. William Wordie's decision in 1840 to support the 'newfangled invention' of railways has borne good fruit. Under their rule there has been no going back, the firm being agents for the Caledonian Railway at twenty-eight places, besides being agents for other railways in many parts of Scotland.

About 1896 they made a start at Newcastle as local agents for the Caledonian Railway, and the firm has also opened agencies in Ireland.



MR. GEO. ROBB,
SUPERINTENDENT CARTING DEPARTMENT.



MR. JOHN WORDIE.

MR. PETER WORDIE.

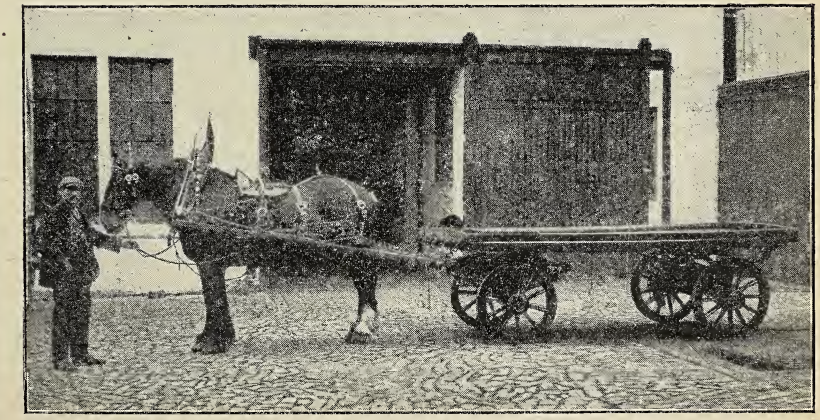
In the early years of the nineteenth century transport in Scotland was by pack horses, while now the land is covered with railways, and in the towns steam and petrol motor lorries convey goods from all parts of the world to our own firesides, or, at any rate, doors.

In the late 'sixties' the Caledonian Railway, recognising that it was inconvenient to have so many different firms employed in the collection and delivery of goods, came to the conclusion that it would be to the advantage, not only of the traders, but of the company, were the company to directly undertake at least a portion of the work.

Following on this, the company instituted the Carting Department on February 1st, 1870. This, of course, was in addition to Messrs. Wordie and Company, who still continued to be contractors to the Caledonian Railway. It bought the stock and plant of Messrs. C. Robb and Company and Messrs. J. and P. Cameron at the stations on the line where these firms performed work for the railway, and the railway's Carting Department, under the management of Mr. George Robb, took over the part of the work formerly performed by Messrs. C. Robb and Company and J. and P. Cameron.

The department started at 19 stations. At the present time it serves 55. The number of staff in the department in 1870 was 450, and at the present time it numbers about 1,000. In 1870 the staff of horses was about 350, and now it is over 1,000. In 1870 the tonnage carted by the department was 319,481 tons, while in 1906 it was 630,510 tons.

The department carries on cartage work at the principal stations. In addition the department has a staff of horses for haulage work at shipping ports. It has been the endeavour of the Caledonian Railway to maintain the staff of horses at the highest standard of quality, and in this it must be said that it has been entirely successful.



CALEDONIAN RAILWAY'S SINGLE-HORSE GOODS LORRY.

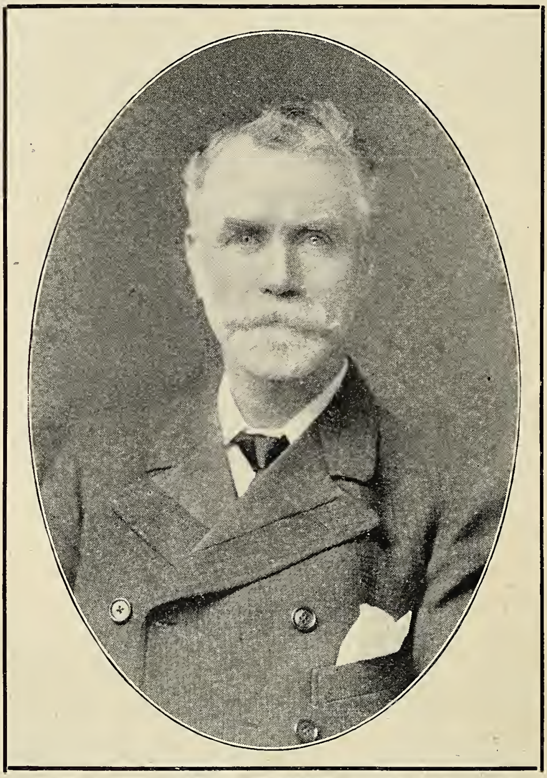
THE CALEDONIAN RAILWAY'S DIAMOND JUBILEE.

The Steamboat Services.

By J. Williamson, *Steamer Superintendent.*

PECULIAR interest belongs to the inception and development of the steamboat service on the Clyde, the district being the cradle of the steamship enterprise of the world, and the Caledonian, the pioneer Scottish Railway and Steamboat Company, which in the forties inaugurated the Rail and Steamboat service to the Coast *via* Greenock, with the steamers *Isle of Bute* and *Maid of Bute*, and afterwards added three others, the *Pilot*, *Pioneer* and *Petrel*, when the competition for the coast traffic became more formidable than anything experienced by the river steamers.

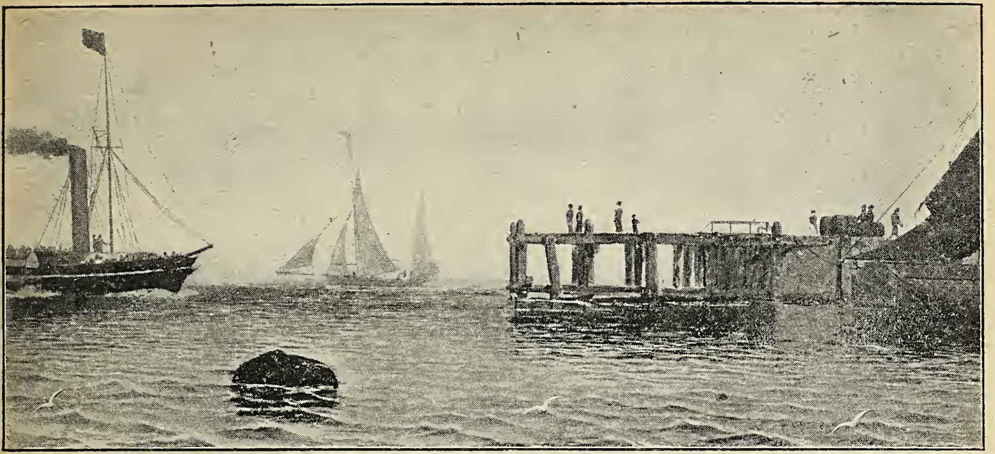
After a time the Railway Company modified the competition by making terms with the steamboat owners to run their vessels in connection with the trains, and from that time the present system of rail and boat to and from the coast has been established.


CAPT. J. WILLIAMSON, STEAMER SUPERINTENDENT.

The modern type of passenger steamer on the Clyde may be said to date from the year 1850. The period then begun was one of great improvement and development in the design and construction of the hull and machinery. The competition was keen, the traffic increased, and the shores of the estuary became popular and fashionable summer resorts. In May, 1865, the important branch line to Wemyss Bay was opened, having direct steamboat connections to Rothesay, Largs and Millport, and being the shortest sea route to these places, the new line soon became popular.

The close of the sixties saw the real beginning of the diversion of the passenger traffic from Glasgow to the coast from the direct river steamers to the railways. "All the way by boat" had lost its charm for the multitude. Part of the reason for this is, perhaps, to be found in the easy-going methods of the up-river steamers, which began to be out of date, but the change was no doubt also due to the malodorous state of the upper reaches of the river in the hot weather.

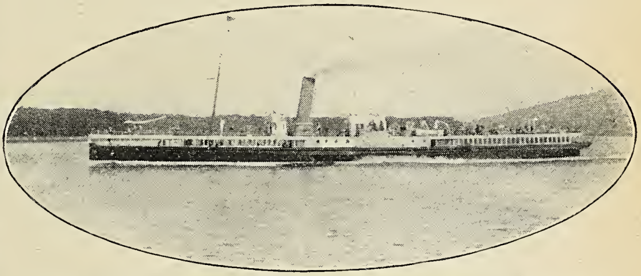
The most effective cause was the expeditious and more business-like methods of the railways. The first inroad, as has been already mentioned, was made by the Glasgow and Greenock Railway, (now a part of the Caledonian Railway) when it put the *Isle of Bute* and *Maid of Bute* and afterwards the *Pioneer* and the *Petrel* on the Dunoon, Rothesay, Largs, and Millport routes. Then, in 1852, the Caledonian Railway, dissatisfied with the independent steamer service, built for its own use the



A CALEDONIAN RAILWAY STEAMER OF 66 YEARS AGO!
The *Isle of Bute* approaching Hunters Quay. This picture is from a painting.

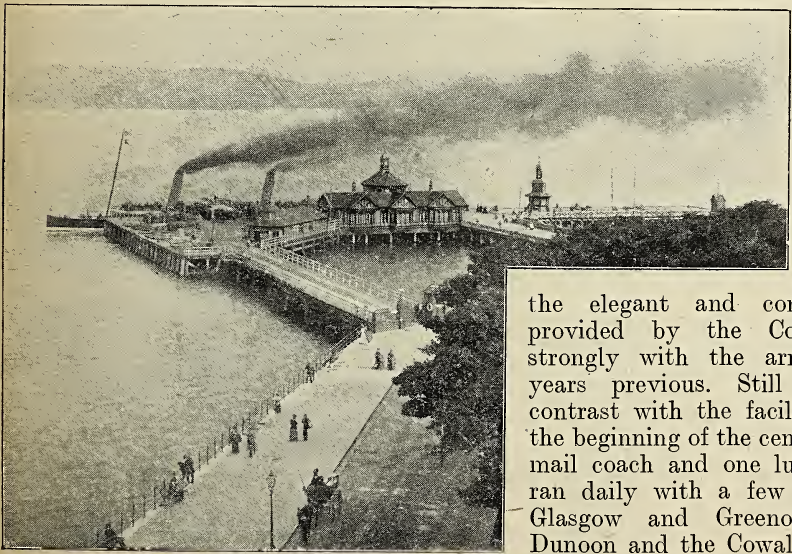
Greenock, the *Glasgow Citizen*, the *Eva* and the *Flamingo*, to attend to the Gareloch, Holy Loch, Dunoon, and Rothesay traffic.

It was not, however, until the close of the eighties, when the Caledonian Railway started to build its present fleet in anticipation of the opening of the extension of the Greenock line to Gourock, which was inaugurated on June 1st, 1889, that the fight of the Packet Companies began.



CALEDONIAN RAILWAY'S STEAMER, *Duchess of Hamilton.*

In the early nineties, the Caledonian Railway built the finest fleet of passenger steamers in Europe. The advantages and inducements now offered for the conveyance of passengers from all parts of the country to the popular watering-places on the Clyde, by the elegant and commodious steamers provided by the Company, contrasted strongly with the arrangements of fifty years previous. Still stronger was the contrast with the facilities in existence at the beginning of the century. Then a single mail coach and one lumbering long coach ran daily with a few passengers between Glasgow and Greenock. Travellers to Dunoon and the Cowal district of Argyllshire had to find their way to the Cloch, and cross the firth in an open ferry boat, while



CALEDONIAN RAILWAY'S STEAMER ALONGSIDE DUNOON PIER.

Galatea. FIRST CALEDONIAN STEAMER OF PRESENT FLEET, BUILT IN 1889.

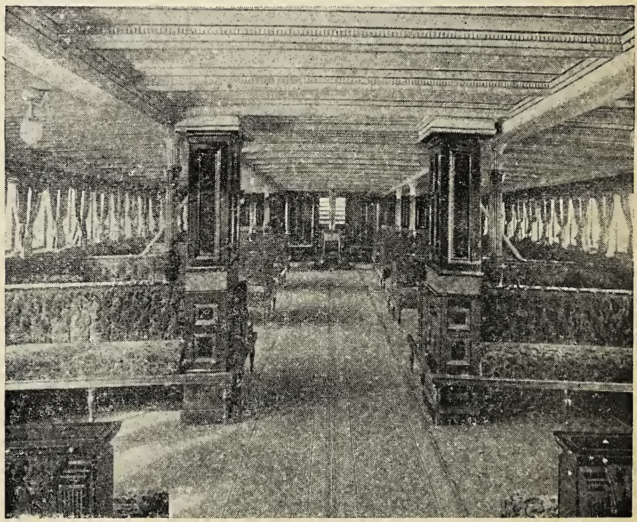
those for Rothesay embarked in small sailing packets, whose arrival at their destination depended entirely on the state of the weather. At the end of the century, on the other hand, what with express trains every hour, and the constantly plying fleets of swift saloon steamers, Dunoon was within three quarters of an hour's run, Rothesay was brought within eighty minutes, and the shores of Arran were within the scope of a return excursion of an afternoon from Glasgow. It can readily be understood that these modern facilities increased the volume of traffic to the coast beyond the dreams of nautical prophets.

At this period the Caledonian Railway secured the traffic both *via* Gourock and *via* Wemyss Bay. At the present time 90 per cent. of the Rothesay traffic goes *via* Wemyss Bay.

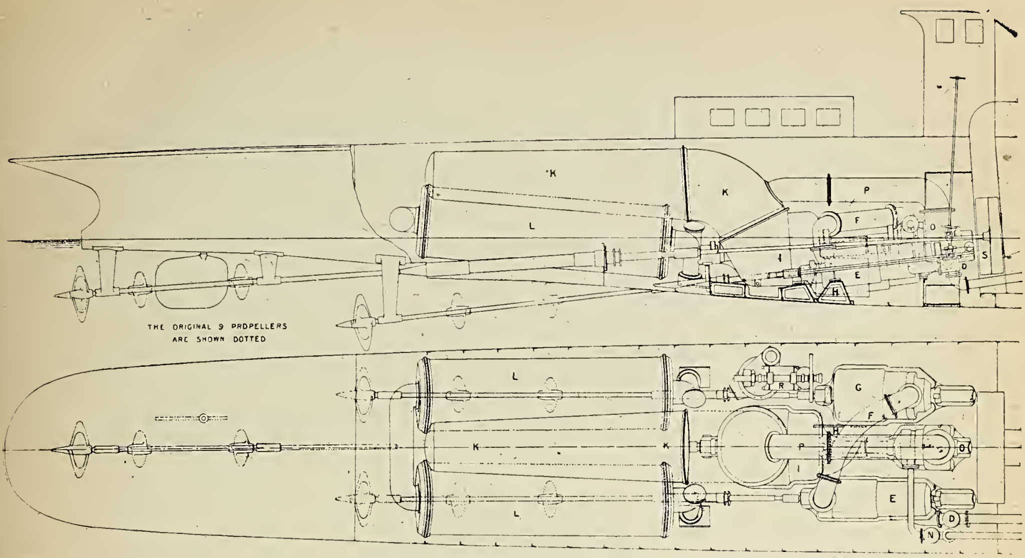
Exactly a year to a day, from the starting of the service, viz., on June 1st, 1890, the Company established a steamboat service between Ardrossan and Arran, in connection with the new Lanarkshire and Aryshire Railway, which completed the Company's connection with all parts of the coast, and practically "scooped the pool." This service was instituted by the introduction of its magnificent steamer, the *Duchess of Hamilton*, built and engined by Messrs. Denny Brothers, Dumbarton. She was, and still is, beyond doubt the finest and most successful craft in the Clyde passenger traffic. As a testimony to the perfection of the arrangements on board, it may be stated that the Committee of the Clyde Yachting Clubs will have no other steamer to act as Club boat during the Clyde yachting fortnight. It may be of interest to know that on board this steamer was fitted the first of Parson's turbine engines for generating the electricity required to illuminate the saloons and other parts of the vessel.

To the Caledonian Railway the population of Arran and the summer visitors to the island are indebted for the magnificent steamers and ample service which they now enjoy on this route. The time between Glasgow and Whiting Bay has been reduced by 1½ hrs., as compared with twenty years ago. As a result of the improved service, the traffic to Arran has more than trebled within that period.

It is an interesting coincidence that on the first Clyde passenger steamer to be built in the new century there should be introduced an entirely new method of propulsion by steam. The placing of the *King Edward* on the water has played a notable part in the introduction of a type of machinery



INTERIOR SALOON OF *Duchess of Hamilton*, BUILT IN 1890.

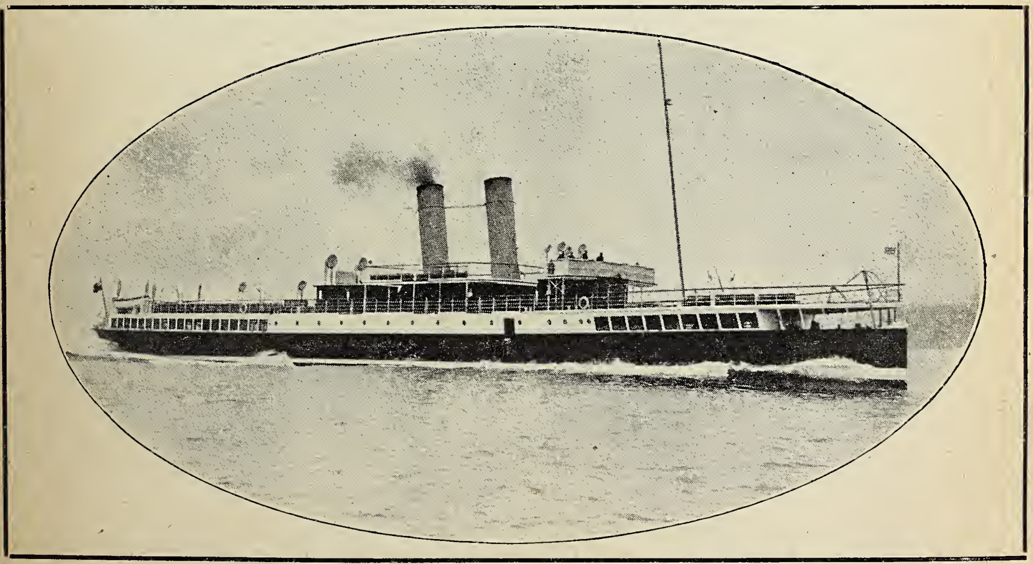


GROUND PLAN AND SECTION OF STEAMER, SHOWING THE PROPELLING MACHINERY OF THE STEAMTURBINE.

which is likely to revolutionise the engineering world in the twentieth century hardly less than James Watt's invention of the separate condenser did in the nineteenth. This type of machinery has been introduced into the Caledonian Railway's latest acquisition, viz., the *Duchess of Argyll*, at present running on the Ardrossan and Arran service, which has provided another proof, if such were necessary, of the superiority of the turbine over the reciprocating engine, the result being an average speed of two knots more with the same amount of coal.

The mileage run by the Caledonian steamers per annum is about 240,000, and during the past eighteen summers close upon thirty millions of passengers have been carried without a single serious accident to a passenger.

The Caledonian Steam Packet Company at present owns a fleet of eleven steamers, sailing regularly from Gourock, Wemyss Bay and Ardrossan to ports in Argyllshire, Buteshire and Ayrshire.



CALEDONIAN RAILWAY'S NEW TURBINE STEAMER, *Duchess of Argyll*.

Canal and Docks Department.

By James Clapperton, *Canal Manager.*

THE project of forming a navigable canal between the Forth and the Clyde was discussed in the reign of Charles II., but had to be abandoned for want of funds.

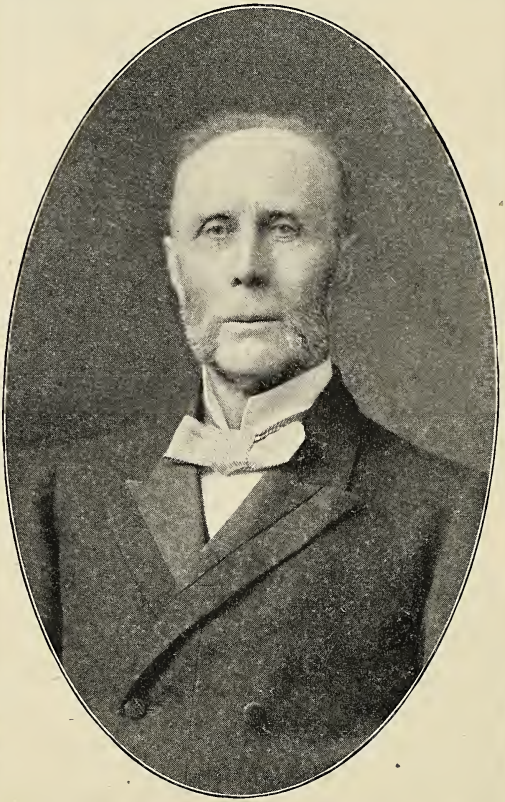
It was revived in 1723, and, by order of the Government, a survey of the ground was made by Mr. Gordon, but his report was not published.

In 1761 Lord Napier employed Messrs. McKell and Murray to make a survey. Their report was favourable, and it was laid before the Board of Trustees for the Encouragement of Fisheries and Manufactures in Scotland.

These trustees employed Mr. Smeaton, the celebrated engineer, to make another survey, and, after much discussion and negotiation, Smeaton's plan was adopted, and in 1767 a Bill was presented to Parliament for authority to construct a canal 7 ft. deep from Grangemouth to the Clyde.

The Act received the Royal assent in 1768, and the work of construction was commenced on July 10th in the same year.

By the year 1777 the canal was constructed and opened from Grangemouth to the vicinity of Glasgow, but by this time the proprietors had exhausted all the funds at their disposal, and the completion of the undertaking to the Clyde seemed hopeless.



MR. JAS. CLAPPERTON, CANAL MANAGER.

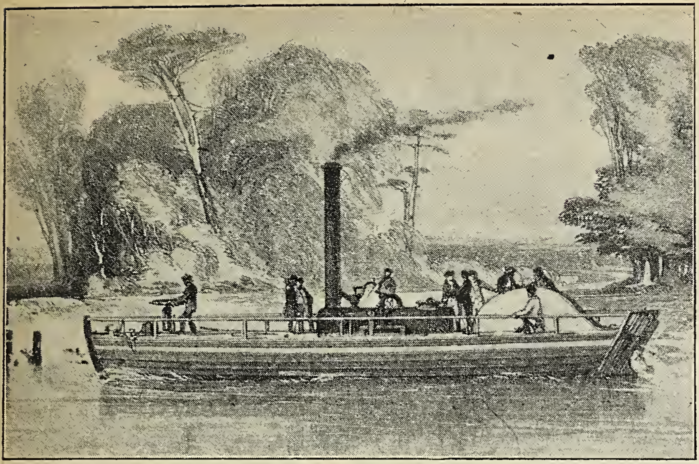
In 1784, however, the proprietors obtained from Government, through the assistance of William Pitt, an advance of £50,000 of the revenue from the forfeited estates of the followers of Prince Charles Edward, which enabled them to complete the Bowling section, and the canal was opened throughout, from sea to sea, a distance of 35 miles, on July 28th, 1790. There had been no undertaking in Scotland approaching this in magnitude for upwards of 1500 years before, when the Roman Legions, under Lollius Urbicus, built their wall across the same tract of country.

At the opening ceremony the Chairman remarked:—

> He felt this to be the most remarkable day in his life, in inaugurating this great national undertaking, by which the means of locomotion in Scotland have at last been perfected.

If the worthy Laird of Elderslie, who thus expressed himself on that summer afternoon in 1790, could revisit Scotland, he would assuredly get his views enlarged.

In 1799, by an arrangement with Pitt, an Act was passed accumulating the whole principal sums and interest due to the proprietors into a capital of £421,525, and this amount, divided by 1,297—the number of the shares of stock—made each share £325.



THE FIRST COMMERCIAL STEAMBOAT.
The *Charlotte Dundas* on the Forth and Clyde Canal in 1802.
From a print of the period.

The Company repaid the debt of £50,000, incurred to the Government, and in the following year (1800) they paid their first dividend of £10 per share. In 1814 they paid £15 per share; this was increased in 1815 to £17 10s. per share, and in 1816 to £25 per share.

In 1783 the Canal Company commenced to carry passengers and goods in track boats between Glasgow and Grangemouth for Leith. In 1809 they built several "swift" boats to carry passengers between Glasgow and Falkirk; these boats performed the journey of 25 miles—on which were four locks—in three and a half hours, and when the Union Canal was opened, in 1822, between Edinburgh and Falkirk, a direct service was established between the two cities by means of these swift boats, which were hauled by a splendid stud of horses, with red-coated, cocked-hat riders.

The number of passengers carried on the canal before the opening of the Edinburgh and Glasgow Railway was close on 200,000 per annum.

The opinion of the Canal Board in regard to a scheme for a railway between Edinburgh and Glasgow was stated to the shareholders as follows:—

> The establishment of a railroad between Edinburgh and Glasgow on the principle of that now in active operation between Manchester and Liverpool never can be attempted with any hope of profit or will ever be undertaken by those who are acquainted with the cost of such enterprises.

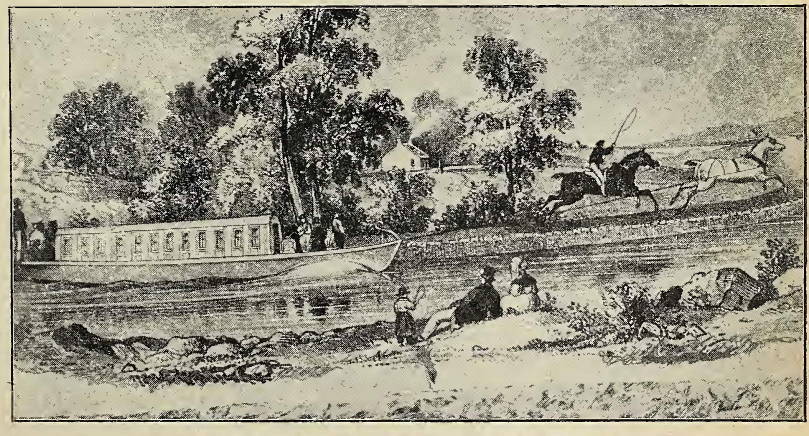
The construction and opening of the Edinburgh and Glasgow Railway was the first serious blow to the prosperity of the canal property, and, by the gradual extension of railways in its vicinity, and the exhaustion of coal pits along the banks of the canal, its revenue continued to decline.

In 1846 the Forth and Clyde Canal Company acquired the Monkland Canal—13¼ miles in length—which extends from Glasgow to the vicinity of Airdrie.

The total length of the two canals is 52 miles 8 chains.

The average width of the Forth and Clyde Canal at top water level is about 63 ft., and at the bottom about 30 ft. The depth of water on cill of the lock is 9 ft. 6 in.

On the Monkland Canal the depth of water on cill of lock is 6 ft.



SWIFT PASSENGER BOAT DRAWN BY HORSES.
Plying on the Firth and Clyde Canal between Glasgow and Falkirk in 1841.
From a print of the period.

SWIFT PASSAGE BOATS.

THE FORTH and CLYDE CANAL SWIFT PASSAGE BOATS start from Port-Dundas, during the SUMMER MONTHS, as follows:—

To EDINBURGH, at 7 and 9 Morning, and 12 noon.
Fares, 6s. and 4s.
To STIRLING, at 7 and 9 Morning, 12 Noon, and 4½ afternoon.
Fares 4s. 6d. and 2s. 6d.
To ALLOA at 4½ Afternoon.
Fares, 5s. and 3s.
To FALKIRK, at 7 and 9 Morning, 12 Noon, and 4½ Afternoon.
Fares, 3s. and 2s.
To PERTH, by CRIEFF, at 9 Morning.
Fares, 12s. and 8s. 6d.
TO KIRKALDY, at 9 Morning.
Fares, 12s. and 8s.

☞ The Boats will be Started from Port-Dundas precisely at the hour, taking the time from the Tron Church Clock.

Canal Office, 1st May, 1841.

HANDBILL TIME TABLE OF FORTH AND CLYDE CANAL PASSENGER BOATS.

The Forth and Clyde Canal rises from Grangemouth to its summit level of 158·45 ft. above ordnance datum by a series of 20 locks.

It rises from the Clyde at Bowling to same level at Maryhill, near Glasgow, by a series of 19 locks, of the following dimensions:—

	Ft.	In.
Length	68	6
Width	19	10
Depth on cill	9	6

It may be interesting to note here it was on this canal that early experiments in steam navigation were conducted.

After a successful trial, in 1789, with a boat which attained a speed of 6 miles an hour, Symington, the inventor of the steamboat, at the request of Lord Dundas, constructed a steamer in 1801 to be used as a tug on the canal.

This vessel was named the *Charlotte Dundas* (illustrated at top of page 235), and was tried in March, 1802, when it towed with ease two loaded barges, each of 70 tons burthen, but the Canal Board objected to its use on the ground that—

> The undulation of the water from the paddle-wheel action would have the effect of washing away the banks of the canal.

One wonders what these cautious Fathers would say to-day if they were told that, of the million tons of merchandise which passes over the canal in a year, about 70 per cent. of it is carried in steam vessels.

During the construction of the *Charlotte Dundas* she was often visited and closely inspected by young a carpenter named Henry Bell, who worked in the neighbourhood.

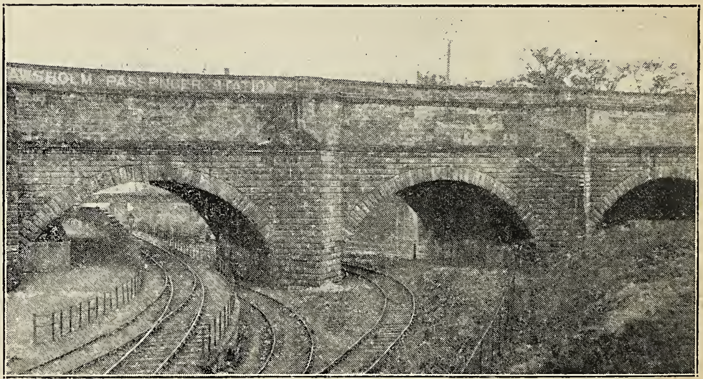
Fulton, the American, who was working out the same problem as Symington, had gone to France to offer his invention to Napoleon, but was unsuccessful. On his way back to America, he visited Symington, who gave him a run on the canal in the *Charlotte Dundas*, and fully explained the working of the machinery. Fulton was greatly pleased with what he saw.

Henry Bell, in 1812, launched the *Comet* on the Clyde, and Fulton, two or three years before that, launched his first steamer on the Hudson.

The Caledonian Railway Company first became interested in harbours as proprietors in 1865, when they acquired the harbour of South Alloa, on the river Forth.

That harbour was at that time the property of the Scottish Central Railway, and when the undertaking of that Company was amalgamated with that of the Caledonian Railway, the harbour naturally passed to the latter railway.

The harbour is a small tidal one, and only suited to vessels with a light draught of water. It was useless as a harbour for the



VIADUCT CARRYING THE FORTH AND CLYDE CANAL OVER THE GLASGOW CENTRAL RAILWAY AT MARYHILL.

shipment of coal from the coalfields of Lanarkshire, served by the Caledonian Railway.

The Caledonian Railway, as has already been mentioned on page 181, set about acquiring such a harbour as would be suitable for the shipment of such coal, and in 1867 they acquired the harbour of Grangemouth.

That harbour was then the property of the Company of proprietors of the Forth and Clyde Navigation. The undertaking of that Company consisted of—

The Forth and Clyde Canal from Grangemouth to Bowling and Glasgow.

The Monkland Canal from Glasgow to Woodhall, near Airdrie.

The Forth and Cart Canal, from the Forth and Clyde Canal at Whitecrook, near Clydebank, to the river Clyde opposite the mouth of the river Cart.

Grangemouth Harbour and Docks.

The eastern half of Bowling Harbour, on the river Clyde.

The Grangemouth Branch Railway from Grahamston (Falkirk) to Grangemouth, and

The Drumpeller Railway, from certain pits in the Coatbridge district to the Monkland Canal at Cuilhill.

The capital of the Canal Company at that date, amounted to £1,141,333 6s. 8d., exclusive of mortgages, which amounted to £250,000.

The Caledonian Railway became bound to guarantee and pay to the Canal Company a fixed annuity of £71,333 6s. 8d., being 6¼ per cent. on the capital of the Canal Company.

In 1867 the tonnage dealt with at Grangemouth was 464,160 tons, in 1869 it was 462,397 tons, and in 1874 it was 759,252 tons.

By this time it was seen that the traffic had outgrown the capabilities of the port, and the merchants and traders became clamant for more dock accommodation capable of dealing with a larger class of vessels than had been in the habit of using the port.

The directors of the Caledonian Railway, aware of the reasonableness of such demands, in 1876 obtained authority to construct a new dock, 20 acres in extent, and to dredge the river Carron (the entrance from the Firth of Forth to the docks) to a depth of 25 ft. at high water of ordinary spring tides.

The operations of building the dock were at once begun, and the dock was completed

THE PLEASURE STEAMER, *Fairy Queen.*
Which plys between Port Dundas and Craigmarlock on the Forth and Clyde Canal.

and opened for traffic on June 3rd, 1882. The dock is now named "Carron Dock." (Illustrated on page 178.)

A great deal of money was spent in dredging the river Carron, but it must be said, with regret, that the same success which had been achieved in the construction and fitting up of the dock, did not attend the dredging of the river.

After long and strenuous efforts, it was found impossible to maintain a depth of 25 ft. in the river. It seems that whenever a part had been dredged to the required depth, it at once filled up, and at last the attempt was given up as hopeless. A certain increased depth was maintained through continuous dredging, but not the depth sought for.

In 1882, the year the new dock was opened, the tonnage dealt with at the port amounted to 858,235 tons, in 1890 it had increased to 1,759,749, and in 1896 it was 2,418,878 tons.

Again, it was found that the traffic had outgrown the accommodation provided, and again the merchants and traders were clamorous, not only for more dock accommodation, but also for a new entrance direct from the Firth of Forth, so as to avoid the necessity for using the somewhat tortuous and shallow river Carron.

The directors of the Caledonian Railway, after many consultations with eminent engineers, at last formulated a scheme which they believed would meet the requirements of the port for some years.

That scheme consisted of a new dock of 30 acres in extent, a canting basin of 10 acres, a new entrance lock on the south shore of the Firth of Forth, a channel between the entrance lock, canting basin, and new dock, and another channel between the new dock and the then existing docks, together with a timber basin of 23 acres—altogether about 100 acres of water.

STEAMER ENTERING LOCK AT GRANGEMOUTH DOCK.

Most of the ground upon which it was proposed to erect the works was foreshore, and this of necessity required to be reclaimed.

Accordingly, application was made to Parliament, and authority was got, in the Session of 1897, to construct the works referred to.

The construction of the works was let in September, 1898. Work was soon afterwards commenced, and the whole were completed and opened on October 8th, 1906. The new dock has been named "Grange Dock."

The sea lock, which now gives access to all the docks at Grangemouth, is 626 ft. long and 80 ft. wide, with three pairs of gates, which divide the lock into lengths of 250 and 376 ft. There is a depth of water on the cill of the sea lock of 30 ft. at high water spring tides, and 12 ft. at low water. The depth of water on the cill of the caisson of the new dock is 26 ft.

The new dock has been fitted up with the latest design of coal hoists, capable of lifting a dead weight of 32 tons to heights varying from 40 to 50 ft. above rail level, which enables coal to be tipped into the largest class of vessel. The docks and dock property are lighted throughout by electricity.

A large number of storage and sorting sidings for coal traffic have been put down adjacent to the coal hoists; such sidings are so laid out that the wagons are run on to the hoist and off again by gravitation.

In addition to the sidings in the docks, the railway company has also provided a large marshalling yard for dock traffic at Fouldubs, immediately to the south of the docks. (Illustrated on page 181.)

In short, everything has been done that human ingenuity can devise for the speedy dispatch of traffic, whether into the ship or from the ship.

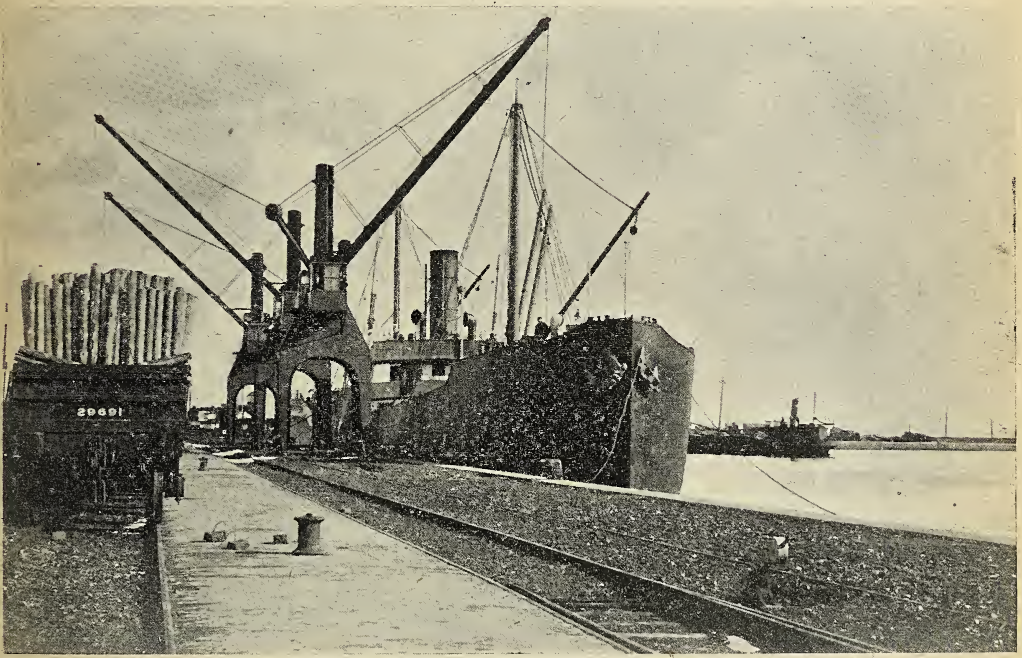
The following examples will show the despatch which is given to vessels loading coal at the hoists at Grangemouth when the cargo is alongside. The vessels undernamed were loaded under ordinary conditions and no special effort made :—

SS. *Lady Cory Wright*, loaded 3,875 tons coal and 75 tons bunkers, in 12 working hours.

SS. *Hornsea*, loaded 3,682 tons coal and 358 tons bunkers, in 15 working hours.

Nearly 200 acres of ground around the docks are available for the storage of timber, deals and battens, iron ore, oil, and other merchandise not requiring cover.

In connection with the import of ore and other traffic, the large number of hydraulic cranes which have been provided (40) are of very great advantage in securing quick discharge from the ship to the railway wagons.



STEAMER UNLOADING PITWOOD INTO RAILWAY WAGONS AT GRANGEMOUTH DOCK.

Commodious shed accommodation for the storage of merchandise has also been provided. These sheds have rail connections through them and in front of them, and they are also equipped with hydraulic cranes for the loading and unloading of goods into or from the railway wagons.

The total length of the quayage of the docks is 4,925 lineal yds., and there are in all about 60 miles of sidings and running lines around and in connection with Grange and Carron Docks, in addition to the large yard at Fouldubs, already referred to, for the reception and marshalling of the traffic.

Since the Caledonian Railway acquired the Harbour of Grangemouth, in 1867, they have expended on the construction and equipment of Grange Dock and Carron Dock £1,838,504.

Carron Dock has proved a most successful undertaking, and when the advantages of Grange Dock are fully known, with its direct access to and from the Forth, its excellent equipment, its proximity to the coalfields and iron and steel industries of Lanarkshire and Stirlingshire, and its direct connection with the Forth and Clyde Canal, providing the means of cheap transit into the heart of the manufacturing districts, there is no reason to doubt but that Grange Dock will prove in future as successful an undertaking as Carron Dock has done.

It may be stated that last year, before any benefit was got from "Grange Dock," the tonnage dealt with at Grangemouth had increased to 3,100,000 tons.

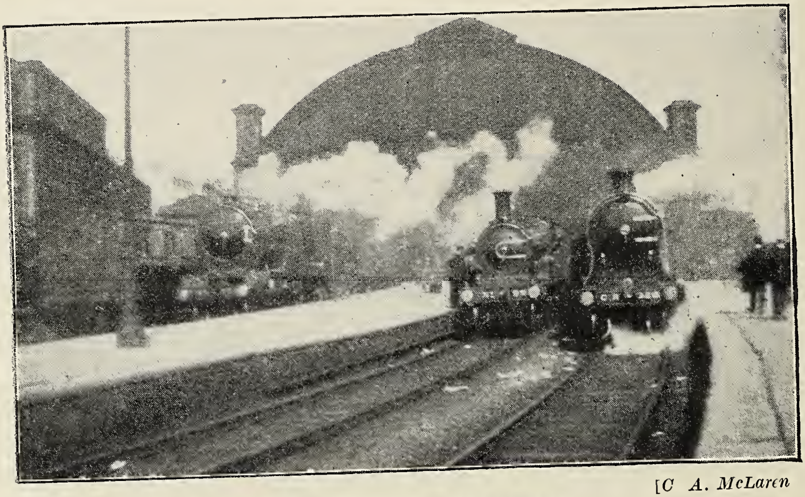
In addition to Grangemouth, the Caledonian Railway is also proprietor of the eastern half of the Harbour of Bowling, on the river Clyde. This harbour was acquired as part of the Forth and Clyde undertaking, and is chiefly used by steamers to bring in iron ore, limestone, etc., for transhipment into lighters to be sent through the canal. This, it must be said with regret, does not obtain to such an extent as it used to do. The railways have diverted a large portion of traffic from the canal.

The Caledonian Railway are also the proprietors of Gourock Harbour. This they acquired in 1869.

The Caledonian Railway also acquired the pier at Wemyss Bay in 1893, when they took over the Wemyss Bay Railway and pier. Since its acquisition the pier has been considerably enlarged, and a new station built.

In addition to being owners of the canals, docks and piers already referred to, the Caledonian Railway has access and works into the harbours of Aberdeen, Montrose, Arbroath, Dundee, Perth, Bo'ness, Granton and Leith on the East Coast, Stranraer (of which it is part proprietor), Ayr, Troon, Ardrossan, Greenock, Port Glasgow, Paisley, Renfrew, Glasgow and Oban on the west coast.

WHERE THREE RAILWAYS MEET.



Photo] [*C. A. McLaren*

"THE RIVALS" AT ABERDEEN.

East Coast Express (North British Railway) on the left; West Coast Express (Caledonian Railway) on the right; "Deeside" Express (Great North of Scotland Railway) in the centre.

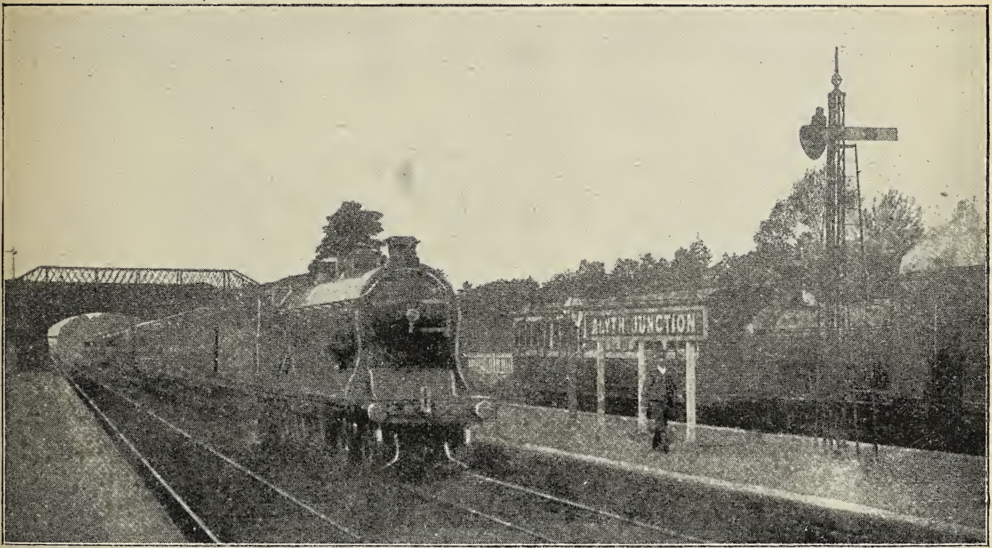
THE CALEDONIAN RAILWAY'S DIAMOND JUBILEE.

Locomotive Practice and Performance.

By Charles Rous-Marten.

THIS being the Diamond Jubilee year of the Caledonian Railway, it has been suggested to me that on the present occasion I should devote my attention exclusively to the locomotive practice and performance of that line. I adopt this suggestion all the more willingly inasmuch as I have had an intimate acquaintance with both practice and performance over a long series of years, and have acquired a warm admiration for them, especially in the later phases of the "practice"; although in saying this I imply no disparagement to the Caledonian's locomotive past.

From a very remote date the Caledonian Railway has been distinguished for possessing fine locomotives and for doing good work. Going back nearly half a century, to the days of Mr. B. Conner, the Caledonian Railway is found even then to have had engines which were second to none of that period, notably the express class with single driving wheels 8 ft. 2 in. in diameter, and outside cylinders 17¼ in. by 24 in. A specimen of that class was shown in the London International Exhibition of 1862, and shared with the two London and North-Western Railway express engines then shown, viz., Mr. Ramsbottom's "Lady of the Lake," 7 ft. 6 in. single, outside cylinders 16 in. by 24 in., and Mr. M'Connell's "Delamere" type, also 7 ft. 6 in. single but with inside cylinders 18 in. by 24 in.—the chief public admiration of that period. It has often been instanced by modern critics as an illustration of the absurdities of former days that such a locomotive as the Caledonian Railway's 8 ft. 2 in. single wheeler should ever have been designed and built for express duty on a main line that had such a bank as that of Beattock—10 miles continuously, chiefly at 1 in 75. Doubtless this must seem very strange to those who do not take the pain to include within their view all the



Photo] [Mr. T. Morrison.

GLASGOW-ABERDEEN EXPRESS AT ALYTH JUNCTION. ENGINE NO. 905. 4-6-0 TYPE.

facts of a case. But the seeming inconsistency disappears when all the circumstances are duly considered. For the Caledonian Railway main line as it then existed, with the speeds then demanded, and the loads then hauled, the 8 ft. 2 in. single wheeler was excellently suited, save only as regarded that one length of 10 miles from Beattock to the summit. Up that incline, when the train was otherwise than extremely light, a pilot or banker had to be taken. But that is done at this very day with loads no heavier in proportion to the power of the locomotives than were those which the old 8 ft. 2 in. singles had to pull. The last time I ascended that bank, only a week or two back, we had a pusher from Beattock to the summit, with a load of barely 200 tons. True, the train engine could have taken that load up the incline with perfect ease; but we had been badly blocked by a train in front, and it was desired to gain time where feasible; so there would have been no sense in rejecting the chance of recovering a few minutes up the bank through the aid of a "shove in the rear." There is no reason why a train should be delayed on such a grade as that of Beattock through mere sentimental objection to assistance which is at hand and waiting to be employed. The case is very different when expresses are run "double-headed" for 150 miles or so, merely for the sake of a few miles of 1 in 100 to 1 in 200, owing to train engines' inability to do normal work. A grade like that of Beattock—1 in 75—is not to be treated by normal methods. I have declared more than once my fixed opinion that no engines will ever be designed or built capable of taking such banks as those of Shap and Beattock, where the rise is at 1 in 75, in their ordinary stride, that is to say, as a convenient or economical normal performance. What applied to Mr. Conner's 8 ft. 2 in. single-wheeler nearly 50 years ago applies, *mutatis mutandis*, even to Mr. McIntosh's gigantic machines of the 20th century, notwithstanding that they can and constantly do perform locomotive work which has never yet been surpassed in this kingdom, which, indeed, has seldom been equalled.

But the 8 ft. 2 in. singles were admirably adapted to most of the Caledonian Railway main line of the '60's. Remember, it has easy grades all the way from Carlisle to Beattock, and after the terrific climb to the summit, when the use of a 'pusher' is not only defensible, but advisable, there is an almost continuous down grade to Glasgow, and also, with the exception of a short distance out of Carstairs, to Edinburgh. It is true that, coming south, each of the converging lines—from Glasgow and Edinburgh, respectively—has some distance of rather hard up-grade work, *i.e.*, at 1 in 100; but even in these days piloting is not wholly unknown from Edinburgh to Cobbinshaw and from Glasgow to Carstairs; nor is it in either of those cases at all unjustifiable with present-day loads. With the loads of the

Photo] [*Mr. T. Morrison.*

2 P.M. DINING CAR EXPRESS, LEAVING GLASGOW CENTRAL FOR CARLISLE.

'60's, the 8 ft. 2 in. singles, which ran with unsurpassed ease and swiftness as well as economy over most of the line, were as excellently suited to the work they had to do as they would be wildly unsuitable to the duty of the present day. The 8 ft. 2 in. singles had their day, and they did credit to it; but that day has passed away, never to return. Still, it is only fair to those who have gone before to do justice to them and their work by considering it in full view of all the circumstances of the case and age.

It will be convenient to divide the Caledonian Railway's locomotive history into three periods: the ancient, the modern, and the present day. With the first I have already dealt to some extent, and I need only add that in the limited experience which I was able to have with the Conner 8 ft. 2 in. singles, I found them, as I have already described them, singularly easy in running and remarkably swift. With their large driving wheels and short piston stroke—24 in.—this was to be expected. They always reminded me of the London and North-Western Railway 8 ft. 6 in, single "Cornwall," alike in appearance and in steadiness of running, especially at the highest speeds at which I timed them, viz., 70 to 75 miles an hour. I have always regretted that one of these interesting engines was not preserved; although, of course, like "Cornwall," which was shown in the London International Exhibition of 1851, the Caledonian Railway 8-footers had undergone drastic changes in form. However, now that the Great Western Railway's veterans, "North Star" and "Lord of the Isles," have both gone to the scrap heap, I fear we cannot look for the preservation of "the lights of other days" as regards locomotive history.*

In those days the Caledonian Railway was almost wholly, if not quite, given over to the outside position for the cylinders. Single-wheelers, and four-coupled and six-coupled classes alike had outside cylinders, and it was not until what I have styled the "modern" period set in, with the accession of Mr. Dugald Drummond to the St. Rollox chieftaincy, on his migration from the like position at Cowlairs, that the era of the inside cylinder set in on the Caledonian Railway. But first, if I remember rightly, Mr. Dugald Drummond began by trying to bring some of the old outside-cylindered four-coupled engines up to modern requirements. He rebuilt as express engines some of the existing 6 ft. 2 in. four-coupled express goods engines. I cannot say that I ever regarded the results as entirely satisfactory; but I suppose they were meant merely for a temporary makeshift. It was with his "66" class that he started the new era on the Caledonian Railway. The engines of this class, which originally numbered 66–75, were virtually slightly larger reproductions of Mr. Drummond's "476" class on the North British Railway. They had leading bogie, four-coupled 6 ft. 6 in. wheels, and inside cylinders 18 in. by 26 in. For their period, they were distinctly effective and successful engines. Indeed, Mr. Drummond's earliest standard express engines on the London and South-Western Railway, when he subsequently removed to Nine Elms, *i.e.*, No. 290, etc., were virtually identical in type with only slightly larger dimensions. And the type was also adopted by Mr. Peter Drummond, the brother of their originator, in his "Ben-y-gloe" class on the Highland Railway; the latter, however, having coupled wheels 6 in. smaller. The "66" class on the Caledonian Railway were steadily multiplied during a series of years, and did much good work. Curiously enough, their services were not called into requisition in the first great "railway race," that of 1888, from London to Edinburgh; the reason, however, being that the West Coast loads during that race—only 76 tons behind the tender—were too small to need locomotives of such large power; and secondly, that one particular engine had been constructed which was the very ideal for such duty, the once-famous No. 123, which had 7 ft. single driving wheels and inside cylinders 18 in. by 26 in. and leading bogie. I believe I have given in these pages some account of the more recent work done by that engine before she was relegated to inferior duty. She was a very smart and efficient machine within her limits—of adhesion and boiler power—but was never such a marvel as some of her enthusiasts imagined. Indeed, as a matter of fact, I never found her able to equal her four-coupled fellow-workers even in respect of mere speed. Her greatest achievement during the race of 1888 was to run the train of 76 tons from Carlisle to Edinburgh, 100¾ miles, in 102 min. 33 sec., as timed by one of my most capable and trustworthy friends, Mr. J. Pearson Pattinson, who was good enough to send me full details. During the race to Aberdeen, however, which took place seven years later, viz., in 1895, Mr. Drummond's 6 ft. 6 in. coupled engines had an excellent chance of distinguishing themselves, of which most of them took full advantage.

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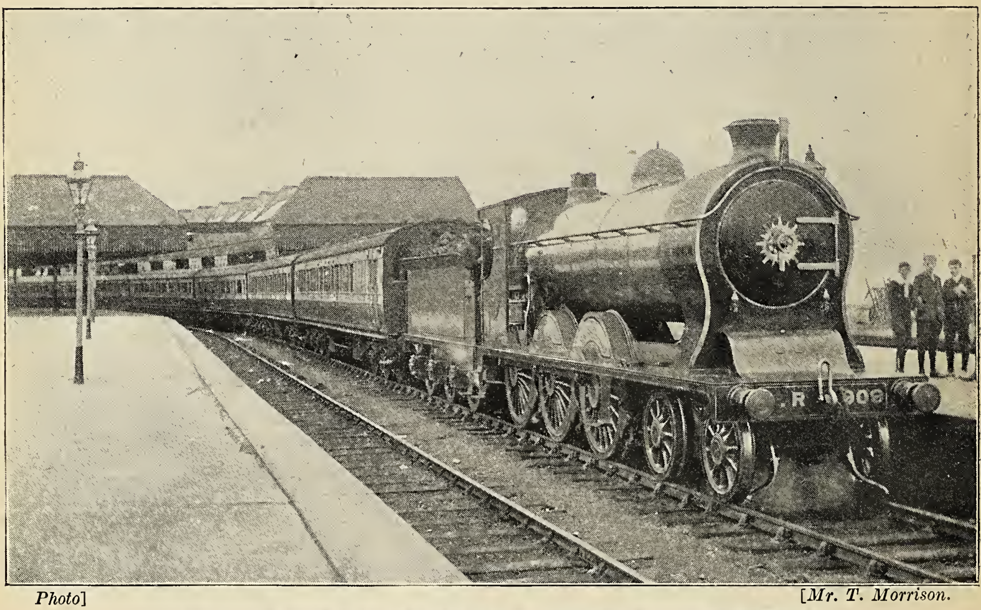
* The London and North-Western Railway is preserving its historical locomotives.—[Ed.]

In the year 1890 Mr. Drummond left the Caledonian Railway service to enter upon the management of an engineering enterprise, and was succeeded by Mr. J. Lambie, whose term of office at St. Rollox was unhappily cut short by illness and death. During his rule there he built six express engines, Nos. 13–18, of an improved and very useful type, with which I personally had many highly satisfactory experiences. One of these, No. 17, had a prominent part in the Aberdeen race, and, as a matter of fact, achieved a performance which stood second among the records of that race. Meanwhile, Mr. Hugh Smellie had come over from the Glasgow and South-Western Railway; but his Caledonian Railway command also was prematurely terminated by his decease. This made way for the accession of Mr. John Farquharson McIntosh, the present most able Locomotive Superintendent, in 1895.

Thus, when the historic "Race to Aberdeen" was so suddenly sprung upon the world, apparently without definite intention on anybody's part, but merely as the outcome of a policy of "drift," Mr. McIntosh had not yet any locomotives of his own design ready to do their part in that memorable struggle. He made, however, very good use of the locomotives left to him by his predecessors. The single-wheeler, No. 123, was looked to by her numerous admirers to eclipse her previous successes and achieve prodigies of swiftness previously unknown. They were doomed to disappointment. For the loads throughout the race, excepting only on the last two or three days, were much larger than those of the former occasion, and the speeds demanded were far higher, while the severe grades to be ascended had lost none of their steepness. It was therefore recognised from the first that the race trains must be run by coupled engines. I made a large number of trips on the racing trains, making quicker time on each successive journey. From Carlisle to Perth I generally had one of the Drummond engines, usually No. 78, 90, or 91; sometimes two together as far as Beattock Summit or Stirling, the loads being by no means what would have been supposed for a racing train, but practically the same as those ordinarily run by the 8 p.m. "tourist" from Euston. During the last three nights of the race the load was reduced to 70½ tons, and some fine speeds were done, No. 78 covering the 117¾ miles from Carlisle to Stirling in 113 minutes. This was by far the best achievement of the Drummond engines, the final run, Perth-Aberdeen, being performed by No. 17, one of Mr. Lambie's build, which twice covered the 89¾ miles from start to stop in 80½ minutes, thus averaging 67 miles an hour, over a road by



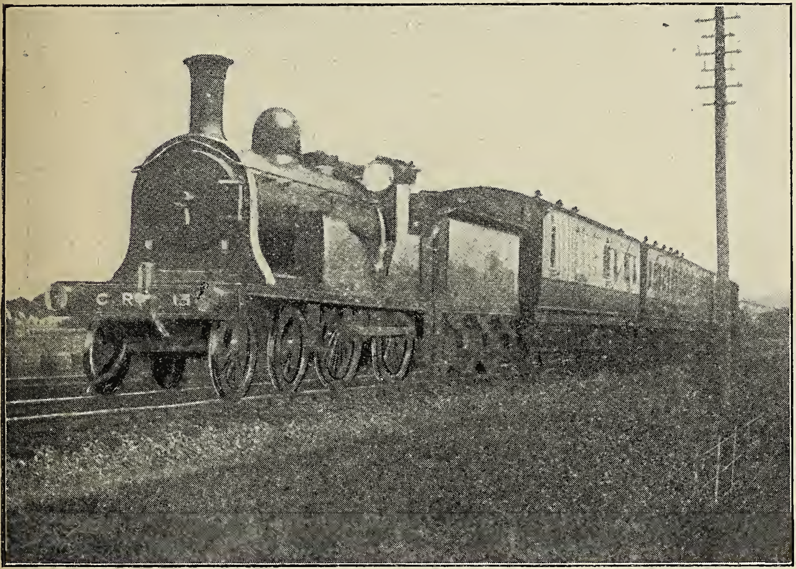
Photo] [*Mr. T. Morrison.*

CLYDE COAST CORRIDOR EXPRESS FOR GLASGOW IN GOUROCK STATION.
ENGINE NO. 909. 4-6-0 TYPE. 5 FT. 9 IN. WHEELS.

no means easy. On the final night the run from Carlisle to Perth, 150¾ miles, was made without stop, but only at a moderate speed, by No. 90. Then the famous race suddenly collapsed, just as its most interesting phase had been reached.

It had been closely watched by Mr. McIntosh, who was planning some new engines—his first express type—and who carefully noted what would have been needed to produce a locomotive that should be equal to increased requirements in respect of speed and haulage had the policy of acceleration been further pursued. The result was the production of the deservedly famous "Dunalastair" type. Mr. McIntosh had recognised that the first requisite was enhanced boiler power, and that this must be sought elsewhere than in the mere augmentation of nominal heating surface—in enlarged diameter of the boiler-barrel, for example. Accordingly, in No. 721, the first of the "Dunalastairs," a boiler was seen which bulged out over the tops of the 6 ft. 6 in. driving wheels, and not only had 1,403 sq. ft. of heating surface—itself at the time a very unusual amount—but also had it in a shape which enabled and caused every foot of surface to give its genuine quantity of heat generation, which was still more unusual. Thus there was no overcrowding of tubes to get a mere paper surface, or extension beyond what was a profitable length merely for the sake of the figures that resulted. The "Dunalastair" boilers were genuine heat generators, and had cylinders proportionate to the steam-generative capacity of the boilers. So the outcome was a type which deservedly has always stood high in reputation on the score of all-round efficiency, as demonstrated by the work actually done.

Coming out in the year 1896, to the total number of fifteen, Nos. 720-735, the "Dunalastairs" were too late to participate in the great race; but they soon gave proof that had they taken part they would have shown figures quite novel in locomotive history. By express agreement there was no racing in 1896. But there was a distinct maintenance of accelerated speed, with the addition of load haulage, that placed that year on a pedestal of distinction from which it has never been displaced. My present concern is solely with the Caledonian Railway, so I cannot notice the fine work of other roads; but I think it is making no unfair comparison to state that the Caledonian Railway bookings were unquestionably the most remarkable of all, and that their paper promises were more than fulfilled in actual practice.



Photo] [*Mr. T. Morrison.*

10.5 *ex* ABERDEEN EXPRESS TO EUSTON NEAR ARDLER. ENGINE NO. 13.

Then was seen for the first time in all history a Bradshaw timing at the rate of over 60 miles an hour from start to stop, viz., the Perth-Forfar run of 32½ miles in 32 minutes, average 60·9 miles an hour. But this, though the fastest booked, was by no means the hardest run the "Dunalastairs" had to perform. The Carlisle-Stirling stage, 117¾ miles, in 125 minutes, averaging 56·5 miles an hour, taking the Beattock incline in its course; and the Stirling-Perth run at a similar pace over the shorter but still steeper Dunblane-Kinbuck bank—part of which is at 1 in 73—these, done nightly well within booked time, with loads up to

200 tons behind the tender, made an epoch in railway history. On many nights in that eventful summer and autumn of 1896 I joined that "Lightning Express" at Carlisle in the small—very small—hours of the early—*very* early—morning, and started at 2 a.m., or a minute or two earlier, on that notable journey of 240 miles, to be run at the highest feasible speed. Possibly, bed might have seemed more attractive—in theory—but I found those nocturnal experiences, albeit somewhat fatiguing, full of the keenest interest to an engineer. Ordinarily, a train of 200 tons behind the tender was taken from Carlisle to Stirling in 115 to 116 minutes for the 117¾ miles, including the unaided climb of over 1,000 feet to the Beattock summit.

Photo] [Mr. T. Morrison.

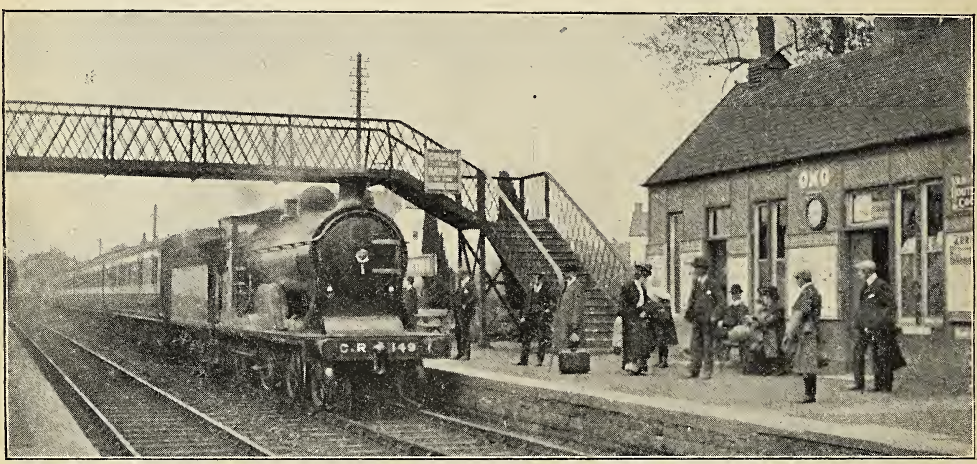
4.5 P.M. *ex* GLASGOW BOAT EXPRESS PASSING BISHOPTON.

Usually we passed that point, just inside 50 miles from Carlisle, in 53 minutes, or a few seconds over, passing Beattock, 39¾ miles, in 37 minutes from the start; nearly all the distance being uphill, mostly at 1 in 200, some steeper, and never dropping below 36 miles an hour even up the final six miles of 1 in 75. The engines were Nos. 728, driven by Robinson, and 733, by Armstrong—both admirable and enthusiastic drivers. I have always looked on those performances as among the best in my memory, even up to the present date, taking the road, loads, and speed all into due account. Two of these trips, which the Caledonian Railway authorities, like myself, classed as "failures," would have been deemed rather brilliant on most railways. In one case, through inferior coal being supplied, by oversight, No. 728 took 123 minutes instead of the scheduled 125 minutes to do the 117¾ miles—Beattock bank included—hauling nearly 200 tons, and being thus two minutes before time. In the other case, the same engine, after covering the first 100 miles in 97 minutes, only reached Stirling "on time," owing to the loss of 12 minutes through obstruction by a Royal horse-and-carriage train. Such "failures" speak for themselves. They would be a matter of just pride to some railways. As for the record time run of 32½ miles in 32 minutes, I found it almost invariably done to time, or under; but however brilliant, it bore no comparison with the Carlisle-Stirling work, owing to the lighter loads and easier grades after Perth; but one run of the Postal train from Perth to Aberdeen—89¾ miles in 88 minutes, with 180 tons, by No. 724, driven by Souttar, the hero of the racing record—deserves the highest credit; and our up journey from Forfar to Perth in 31½ minutes for the 32½ miles, with 15 coaches, by No. 725 (Mitchell, driver), was another striking feat. All these were achieved by the "Dunalastairs" of the first batch. Before the second, or "Breadalbane" batch came out, the accelerations were a thing of the past, a mutual agreement between the West and East Coast lines having brought about retardations, ranging up to 50 minutes in the Anglo-Scottish transit times, which came into effect in the winter of 1896, and have continued in force ever since.

Consequently there has been smaller opportunity for displays of sheer brilliance on the part of Mr. McIntosh's subsequent creations, and they have had to be content with the accomplishment of remarkable feats of load hauling at high velocities, if not the highest, as in 1896. The "Breadalbanes," Nos. 766-780, "900's," Nos. 887-902, and "140's," Nos. 140-150, all have maintained the same general type as the original one, and have differed little, save in a steady increment of boiler and cylinder capacity and of steam pressure. It is true that the "140's" have their boilers slightly coned, but only to the extent of about two or three inches increase in the barrel-diameter. Even this is not perceptible externally, the sheeting and lagging being so arranged as to preserve the true cylindrical form. The heating surface has been increased in each of the four separate batches of the "Dunalastair" type as follows:—1,400 sq. ft., 1,500 sq. ft., 1,600 sq. ft., and lastly, 1,651 sq. ft., the steam pressure being concurrently increased from 160 and 175 lbs. to 180 lbs. per sq. in. These engines have given me many striking performances. One ran with 305 tons behind the tender from Strawfrank Junction to Carlisle, 73¼ miles including the ascent to Beattock summit, in 75 min. 26 sec. No. 140, the pioneer of the "140's" did even more than this, taking the enormous load of 404 tons from Edinburgh to Carlisle, 100¾ miles, in 113¾ minutes, assisted by a pilot only as far as Cobbinshaw, where a special stop was made; the distance of 82½ miles from Cobbinshaw to Carlisle was covered with that huge load in 87 min. 27 sec., the 73¼ miles from Strawfrank to Carlisle occupying 76¾ minutes, and the 49¾ miles from the summit to Carlisle only 46 min. 7 sec. In the opposite direction, but with a lighter load, of 170 tons, a sister engine, No. 141, starting from Carlisle 14 minutes late, actually reached Edinburgh 21 minutes before time, having thus gained 35 minutes upon the schedule, and covered the distance in 107 minutes, notwithstanding a three-minutes' stop (for signals) on the Beattock incline. It is noteworthy that the speeds throughout this brilliant run were strictly moderate throughout.

At this stage I reach what must be regarded as the purely present-day era of Caledonian Railway locomotive engineering. Four years ago Mr. McIntosh was forced to the conclusion that even his latest type of four-coupled engines, admirably efficient as these engines were, could not be deemed fully capable of grappling in all weathers and all circumstances with the enormous loads that they were now required to haul. He decided that before all else a large increase in boiler power was essential, and the question which thereupon arose was, by what method should this be provided? It was clear that a fifth pair of wheels would be needed to support satisfactorily the greatly enlarged boiler that was contemplated. The alternatives which presented themselves were: (1) the Atlantic, or 4-4-2 type; (2) the 4-6-0. I believe I am accurate in stating that Mr. McIntosh's original preference was for the former. Basing his opinion on his experience up to that date, he held that four-coupled wheels were always preferable to six-coupled wheels for fast express service, provided that the four-coupled engines could haul the requisite load up existing gradients at the speeds necessitated to keep booked times. After long and careful consideration and experiments, Mr. McIntosh arrived at the same conclusion as that to which Mr. Churchward has been brought, more recently, on the Great Western Railway, by an exhaustive series of careful trials, namely, that sufficient adhesion weight for his purpose could not be got on British roads with four-coupled wheels, and that the employment of a third pair was essential to successs. The outcome, as is well known, was the construction of Nos. 49 and 50, to which were given six-coupled wheels 6 ft. 6 in. in diameter, the front pair being driven by inside cylinders 21 in. by 26 in. nominally, but in reality, I believe, of 20 in. diameter, it being intended to bore out the additional inch should practice prove this desirable—which so far, I believe, has not been the case. Driving the front pair of six-coupled wheels was a novelty in British practice—at any rate, for express engines. It had been adopted just previously also by Mr. McIntosh in the case of his 4-6-0 class, known as the "Oban" type, which have 5-ft. coupled wheels, placed close together, which, on the sharp curves and excessive gradients of the Oban branch, have proved most valuable and successful engines. It may fairly be said, I think, that this particular design is now established as the standard Caledonian Railway type. To the original five "Obans" have been added four more lately, their numbers now running from 51-59. Nos. 49 and 50 have been joined by five virtually sister engines, Nos, 903-907, which are identical save in a few minor respects, the most important difference being an increase of 3½ in. in boiler diameter and a lengthening of the connecting rod by 4 inches. This lengthening ought to be a distinct improvement.

Latest of all Mr. McIntosh's enterprises in this " new hemisphere " are the production of two fresh classes : (a) the No. 908 Class, the six-coupled wheels of which have a diameter of 5 ft. 9 in., this, of course, being exactly intermediate; (b) a bogie 4-6-0 express goods type, with six-coupled 5 ft. wheels and leading four-wheeled bogie, resembling the " Obans," but with a much larger boiler. Mr. McIntosh has thus created a definite standard type, all six-coupled, the front pair of wheels being the drivers, all having leading four-wheel bogies, and all having very large boilers.



Photo] [Mr. T. Morrison.

ABERDEEN-GLASGOW CORRIDOR EXPRESS ENTERING ALYTH JUNCTION.
ENGINE NO. 149, 4-4-0 TYPE.

Of the splendid work performed by the express class of the 4-6-0 engines, I have on various occasions given some striking examples in the columns of the Railway Magazine. Since then I have added to the list other notable performances. Only a few days ago, No. 907, driven by Kemp, and hauling 350 tons behind the tender, ran from Glasgow to Carlisle in 2 hrs. 6 min. 17 sec. inclusive, with a stop of 2 min. 19 sec. at Motherwell, consequently in 2 hrs. 3 min. 58 sec. travelling time, equivalent to 2 hrs. 2 min. net time—an exceedingly fine performance. A minimum rate of 50 miles an hour was sustained the greater part of the way to the Beattock summit, and even up the last length, rising 1 in 100, the speed did not drop below 40 miles an hour, excepting fractionally and momentarily at the summit, I suspect through the driver notching up a little prematurely. Speed was carefully eased down the Beattock incline, and was never allowed to rise to any very high point all the way to Carlisle, the time from Beattock summit being 48 min. 58 sec.

With No. 908, which has 5 ft. 9 in. coupled wheels, hauling the " Grampian Corridor Express " of 250 tons from Glasgow to Perth, I recently had a good run, marred only by the blocking of holiday traffic. A minimum speed of 31 miles an hour was maintained up 1 in 73 on the Dunblane bank, while on the easier lengths of road No. 908 ran very freely at rates up to 65·2 miles an hour. On the subsequent stage to Aberdeen No. 904, which has 6 ft. 6 in. wheels six-coupled, took a load of 270 tons from Perth to Forfar, 32½ miles, starting with a seven-mile bank at 1 in 173 to 1 in 93, in 36 min. 29 sec., without exceeding a maximum rate of 67 miles an hour, and ran the next short stage to Bridge of Dun, 15½ miles, in 17½ minutes, start to stop, maintaining a minimum rate of 60 miles an hour on the rising grades. The rest of this journey and that in the opposite direction were greatly spoiled by unavoidable signal slacks and stoppages, but the actual work of the engines themselves was in all respects admirable. On the return trip, No. 145, one of the newest " 140's," with the Postal train of 220 tons, ran from Forfar to Perth, start to stop, in 33 min. 44 sec.

. . . THE . . .
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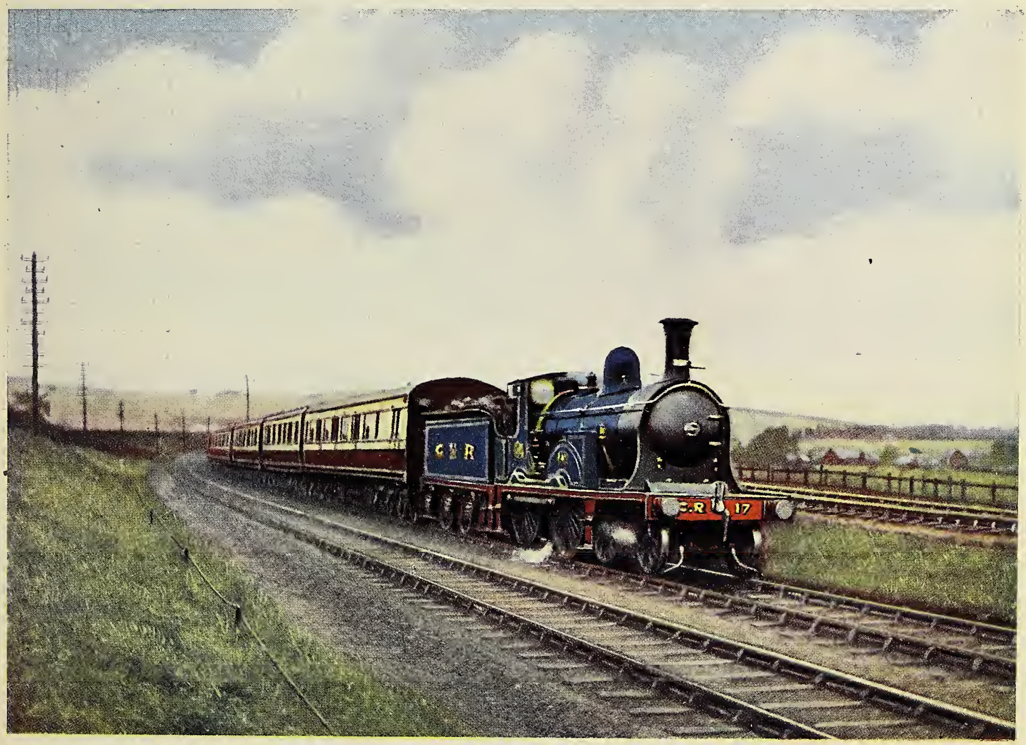
Twentieth Century Railway Development.

No. 13.—THE CALEDONIAN RAILWAY.

THIS company,—conspicuously progressive from its inception,—has never shewn to better advantage than in the range and extent of its twentieth century developments.

Time has but confirmed the sagacity and foresight of its projectors, whose ambitious route the Government of the day, firmly believing it to be absolutely impossible that there should ever be any necessity for more than one railway into Scotland, referred to a Royal Commission, which, in 1841, recommended the Caledonian as the Scottish National Railway.

The Caledonian Railway, with its numerous amalgamated lines, is still, in many



THE POPULAR 'TINTO' EXPRESS AT FULL SPEED; HAULED BY 4-4-0 LOCOMOTIVE NO. 17.

respects, SCOTLAND from the railway standpoint; and the recent expansion of its system serves to accentuate and strengthen the claim.

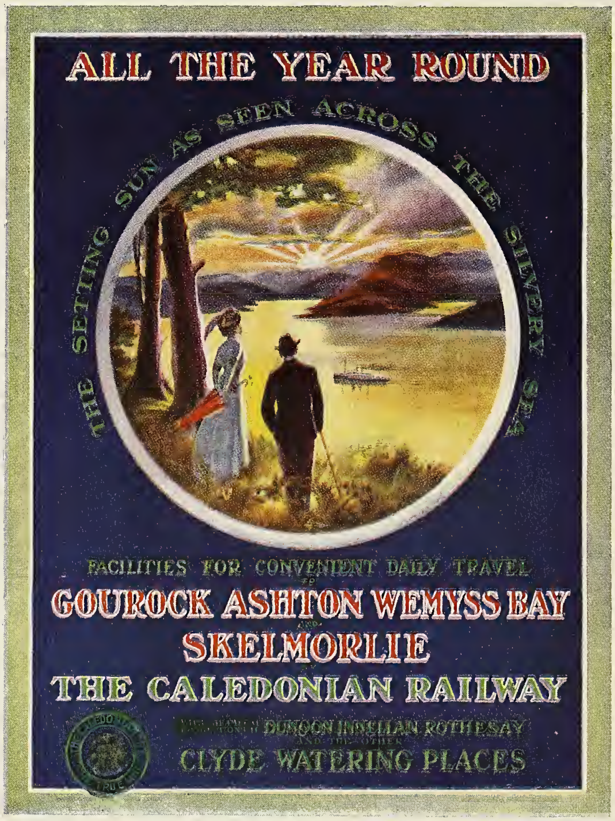
ENGINEERING.

In the Engineering Department the past twelve years' activity has been phenomenal and noteworthy.

Since 1900 the mileage of the railways owned and worked by the Company, which is now 876¼ miles, has been increased by 94¼ miles. Where lines are worked by the Company but only partly owned, as in the case of Joint Lines, etc , the mileage is now 159½ miles, or an increase of 5½ miles since 1900.

On the lines belonging to other companies, but worked by the Caledonian Railway Company, such as the Callander and Oban Railway, the Lanarkshire and Ayrshire Railway, the Cathcart District Railway, etc., the mileage is now 156¾ miles, which is an increase of 24¾ miles on the corresponding mileage in 1900. The Lanarkshire and Dumbartonshire Railway, extending in length to about 18 miles, which was formerly owned by a separate company, was taken over in August, 1909, by the Caledonian Railway, in which undertaking it is now incorporated.

The outstanding feature of the period is undoubtedly the reconstruction and extension of Glasgow Central Station. Due to the rapid growth of traffic, the old station became totally inadequate to meet the requirements, and there was frequently great congestion at the *concourse* and on the platforms. The chief features of the extension are the increase in the number and length of the platforms, the great increase in the area of the *concourse*, the extension of the Hotel, the building of a new bridge over the River Clyde, and the provision of new running lines and auxiliary sidings on the site of the old Bridge Street Station, which has been entirely cleared away.



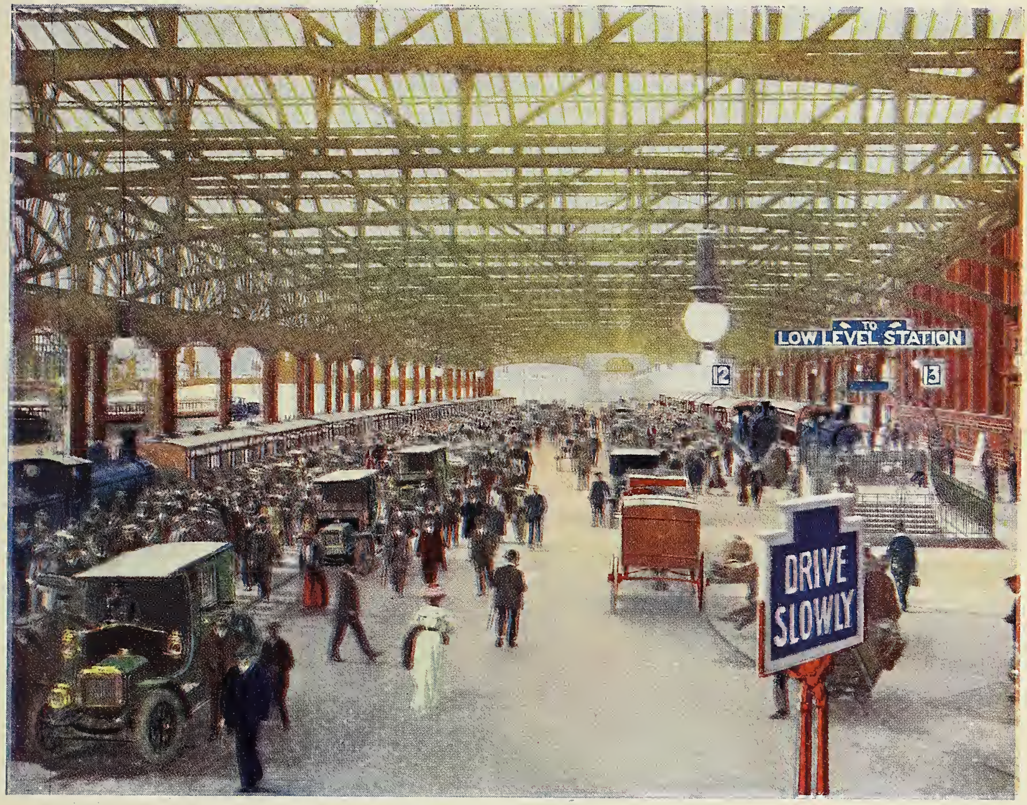
A CALEDONIAN RAILWAY PICTURE POSTER, WITH WONDERFUL SUNLIGHT AND WATER EFFECTS.

In the extension, there has been provided a large Parcels Office at street level under the new part of the station, underground lavatories below the *concourse*, a large Train Information Office, and other necessary platform offices. While the area of the new *concourse*, extending to about 3,000 square yards, is six times that of the old *concourse*, the space now provided is by no means in excess of the requirements, as is graphically shown by the photographs on pages 285 and 287, of holiday crowds assembled there. The number of platform fronts has been increased from nine to thirteen. The roofing over the new part of the station, which consists of elliptical roof girders with light roof principals and patent glazing, is of an elegant and pleasing design.

Of the station itself, with its many conveniences and provision for future requirements—all carried out under innumerable and exceptional difficulties—it is not possible here to enter into greater detail, nor is it necessary to add to the unanimous and oft-expressed appreciation of this vast undertaking.

The new Clyde Bridge (illustrated in colours on page 269) is an imposing structure of five spans, three over the river and one span over each of the streets on either side of the river. The lengths of the three river spans are 160 feet, 200 feet, and 178 feet respectively, and the average width of the new bridge, which carries nine lines of rails, is 110 feet. By adding the four lines of way on the old bridge alongside, there are thus thirteen lines of way crossing the Clyde at this place, which is probably the widest railway river-crossing in the world.

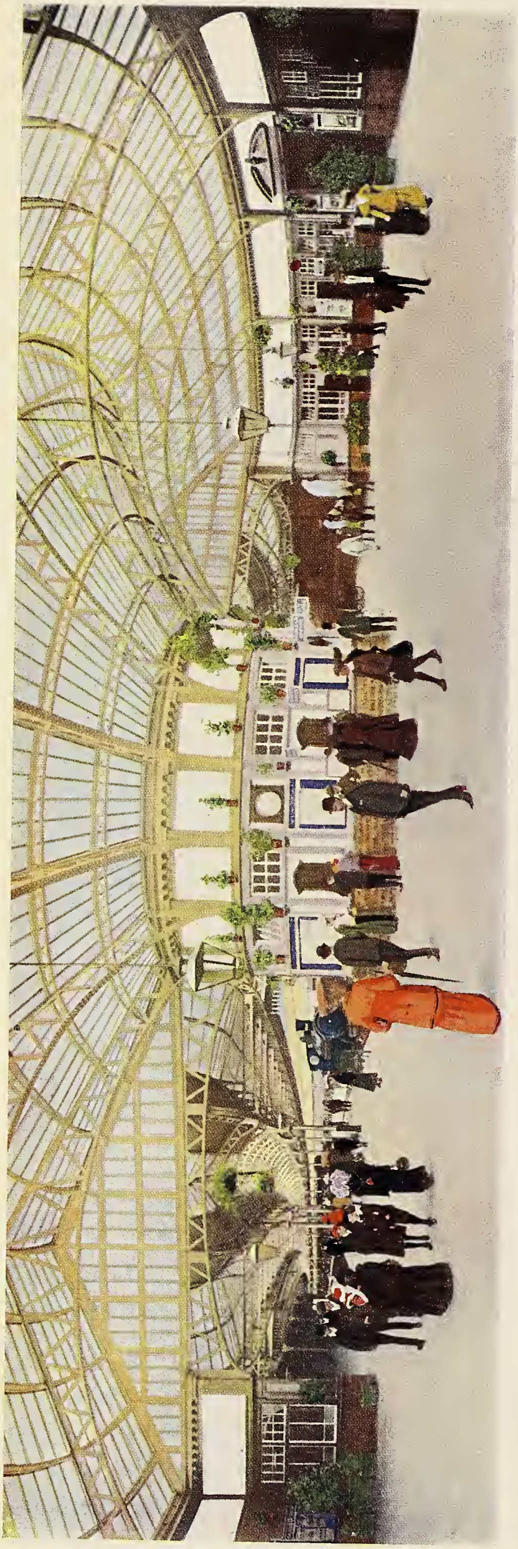
The signalling at the Central Station gave the Railway's officers much thought, and it was as a result of numerous experiments and exhaustive trials that the system which is now in use, namely, the Westinghouse electro-pneumatic power working, was adopted. The continuance of the old manual system at such a busy terminus was impracticable, owing to the fact that it would have meant delay to trains, and there would have been such a complication of signal rods, cranks and wires on the Clyde Bridge as to be unworkable. The installation is certainly the first of its kind in Scotland, and is believed to be one of the largest extant.



MAIN ARRIVAL PLATFORMS, GLASGOW CENTRAL STATION.

At Eglinton Street Station extensive alterations, which were really complementary to the extension of Glasgow Central Station, have been carried out. An additional line of rails has been laid through the station, and the station buildings have been entirely reconstructed.

Other important schemes executed during the period under review include the



INTERIOR OF WEMYSS BAY STATION.

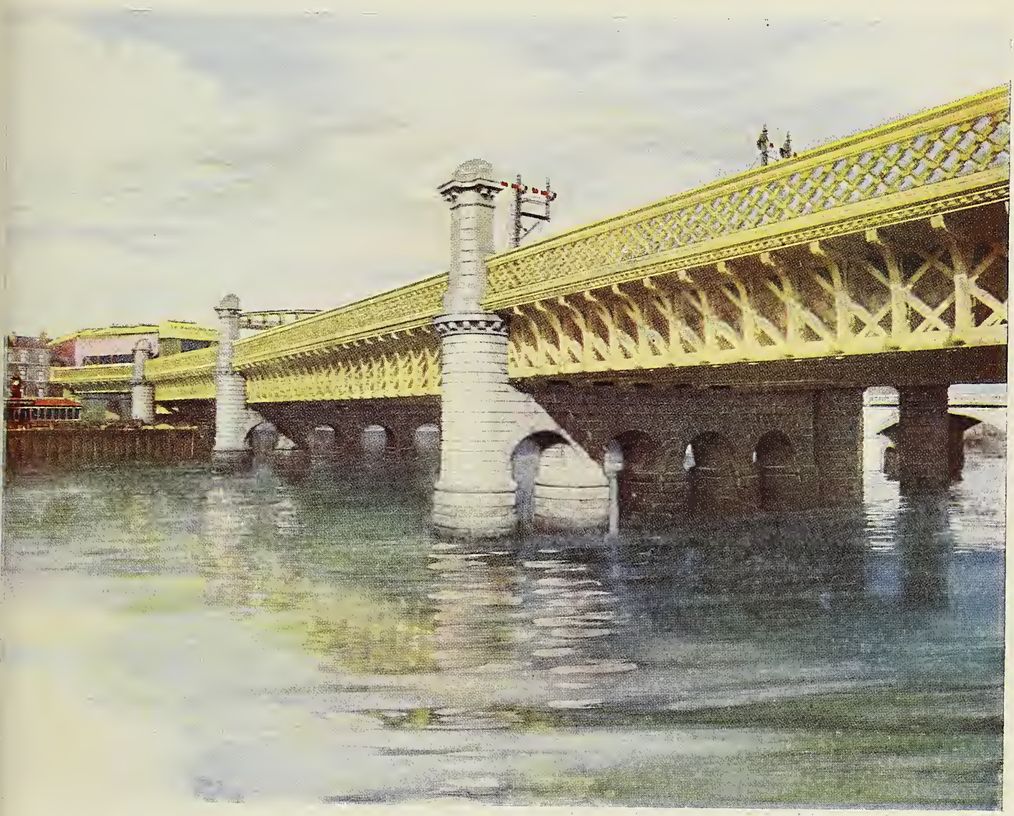
partial conversion from single to double line of the Wemyss Bay branch, entailing with other heavy works the driving of additional single-line tunnels alongside the existing ones at Cartsburn and Inverkip, the construction of viaducts over the Kip and Daff valleys, the building of a sea-wall, and the under-buildings for the new station structures at Wemyss Bay (both of which works were constructed on ground reclaimed from the sea), the extension and widening of the steamboat pier, and the entire reconstruction of the stations at Wemyss Bay, Inverkip and Upper Greenock. Six of the ten miles of the branch have now been doubled, which is considered sufficient for the present to meet the traffic requirements.

In the old station at Wemyss Bay there were only two platform fronts and very limited waiting accommodation, but in the new station a very complete suite of waiting-rooms and other offices has been provided, and the number of platform fronts has been increased to five, one of the latter being specially for luggage traffic. Features of the new station at Wemyss Bay are the roofing over the platforms and *concourse*, and the station buildings. As can be judged from the coloured picture on this page, the station, with its cheerfully artistic interior abounding in floral decorations, forms an æsthetic climax in railway architecture, proving that beauty and utility need not be antagonistic.

A network of new lines has been constructed in the Mid-Lanarkshire and Ayrshire districts, extending in length to about 37 miles—from the old Lesmahagow line near Ferniegair Station to Larkhall, Stonehouse, Strathaven and Drumclog. There is also a connecting line to Alton Heights from Stonehouse, which passes through Blackwood and Lesmahagow. The railway has been constructed for only a single line, but provision has been made in acquiring the land, and in the construction of all overbridges and the principal viaducts, for a double line. There are several large viaducts on the new line, and mention might be made of those at Larkhall and Stonehouse. The former is about 860 feet in length, and the level of the rails is about 180 feet above the bed of the River Avon in the valley below. The Stonehouse Viaduct, over the Avon, is 1,263 feet long, and its height is about 150 feet. One of the earthwork cuttings near Larkhall was of more than ordinary interest. Its length is about three-fourths of a mile, and the quantity of material excavated from it was about 270,000 cubic yards.

Connecting lines between Shieldmuir, Wishaw and Newmains—a total length of about three miles—were brought into operation in 1901, and besides connecting the different places through which they pass, they provide an alternative route for main line trains to the south.

Extension lines in connection with the Lanarkshire and Ayrshire Railway were brought into operation in 1904, the object being to link up this railway with the Caledonian Railway's main line. The longest section of the new lines extends from Cathcart to Newton, a distance of fully five miles.



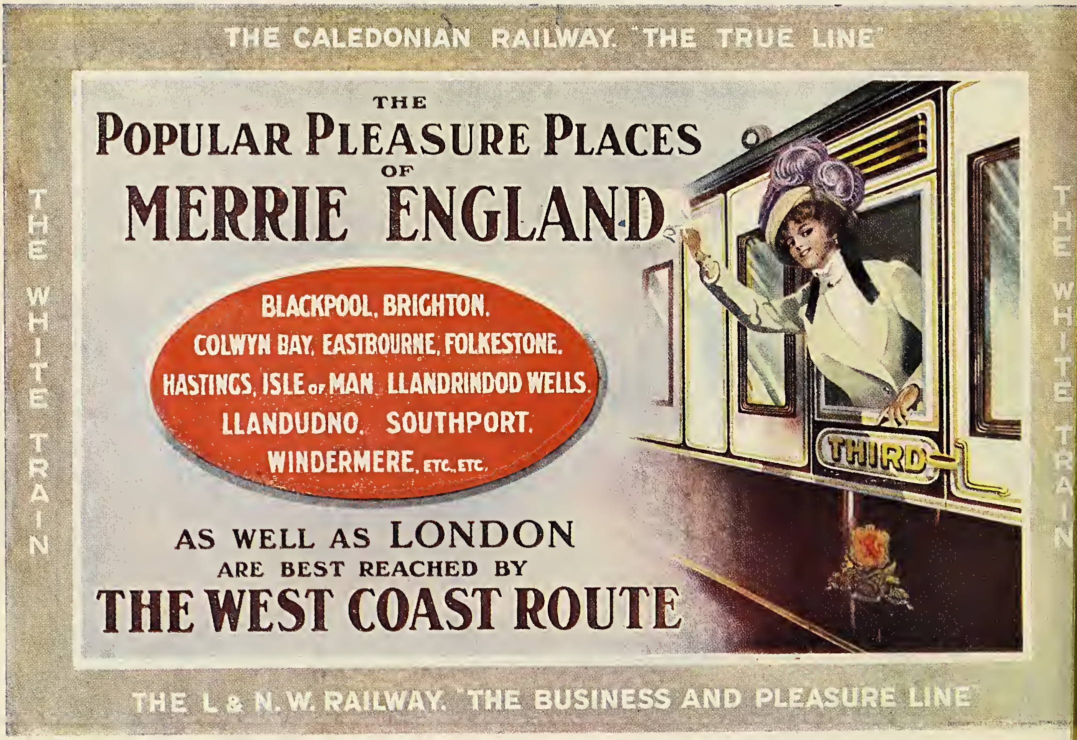
BRIDGE CARRYING THE CALEDONIAN RAILWAY ACROSS THE CLYDE AT GLASGOW.

Since 1900 there has been a great extension of the dock accommodation at Grangemouth—the Company's East Coast port for shipment of coal from the Lanarkshire coalfields. In view of these extensions it was considered essential to have an alternative access to the Docks without having to pass through Grahamston Station, which is usually a very busy place, due to the fact that there is considerable shunting in the vicinity, and that both Caledonian Railway and North British Railway trains make use of the station. In order to meet this need the new Grahamston lines, nearly three miles in length, were constructed. They extend from Sunnyside, a junction between Camelon and Grahamston, to Fouldubs, about $1\frac{1}{4}$ miles south of Grangemouth Station. The Sunnyside portion was constructed by the North British Railway, and the

Fouldubs portion by the Caledonian Railway. Only two lines of way have been laid, but the necessary land for four lines throughout has been acquired. The railway crosses the Forth and Clyde Canal (also the property of the Caledonian Railway) near Dalderse by means of a swing bridge operated by hydraulic power. There are a number of other bridges on the line, but the swing bridge is the largest. It is illustrated on page 282.

Mineral lines have also been formed in the Leith district between Newhaven and Seafield, with branches to Leith Walk Goods Station and Leith South Goods Station, the total length of the new lines and branches being fully four miles. At Seafield about seven or eight miles of sidings have been laid down for the storage of coal.

On the Callander and Oban Line several alterations and extensions have been made. The railway between Dunblane and Doune, a distance of fully four miles, has been converted from a single to a double line, and the station at Doune has been entirely reconstructed. There are commodious waiting-rooms and other station offices, both the buildings and verandah roofing being of very tasteful design. At Oban the Station and Pier have been extended. In the vicinity of the station buildings the harbour has been extended seawards, and two additional platforms and a cab rank have been provided. Branching off the Callander and Oban Line at Connel Ferry, the new extension to Ballachulish, about 28 miles in length, was opened for traffic in August, 1903. An outstanding feature of engineering interest on this line is the large cantilever bridge across Loch Etive. It is 1,044 feet in length, and has a clear headway of 500 feet above high water level. A new line, extending in length to about 15½ miles, has been constructed in extension of the line between Crieff and Comrie, to St. Fillans, Lochearnhead and Balquhidder, where it joins the Callander and Oban Railway. This line affords direct cross-country connection from Perth and Dundee on the east to Oban on the west, thus avoiding the long detour *via* Dunblane.



AN ATTENTION-COMPELLING WEST COAST ROUTE PICTURE POSTER, ADVERTISING ENGLISH PLEASURE RESORTS IN SCOTLAND.

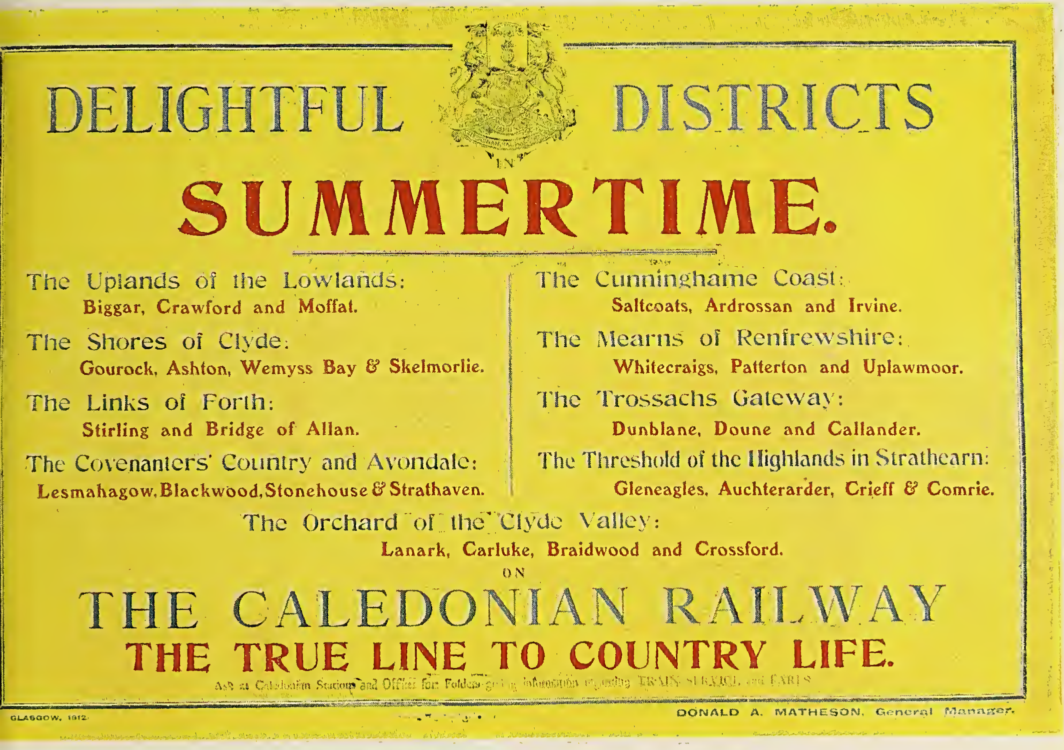
The light railway between Elvanfoot on the main line and Wanlockhead, with an intermediate station at the mining village of Leadhills, was opened for traffic in 1902. This line, which is about 7¼ miles in length, is unfenced, and steps on the sides of the carriages enable passengers to board the train between stations.

To meet the requirements of traffic at the Rothesay Dock, recently constructed at Clydebank by the Clyde Trustees, a branch line from the Lanarkshire and Dumbartonshire Railway has been formed, and extensive siding accommodation has been provided at the dock.

At Ross Junction Yard, which forms the Caledonian Railway's central mineral marshalling yard, extensive additions have been made to the sidings.

At Perth the roof of the oldest part of the General Station has been replaced by a particularly graceful structure, with ornamental verandahs over the docks. A pleasing feature in the station is the display of hanging flower baskets and dwarf bay trees, which impart a delightful effect to the concourse. (See coloured illustration, page 273.)

At the Moncrieff Tunnel, near Perth, an interesting piece of engineering work was the lining with brick of the interior, hitherto for the most part unfaced rock. The task was a difficult one in view of the fact that the main line traffic of both the Caledonian and North British Railway Companies had to be maintained during the whole time the work was in progress. This was satisfactorily accomplished—without accident of any kind—by means of a steel shield moved on side rails, and so constructed as to admit of the passage of single-line traffic, the excavated and building materials being transported by bogies running on small tram-roads at either side, as shown by the photograph on page 283.



DELIGHTFUL DISTRICTS
IN
SUMMERTIME.

The Uplands of the Lowlands:
Biggar, Crawford and Moffat.

The Shores of Clyde:
Gourock, Ashton, Wemyss Bay & Skelmorlie.

The Links of Forth:
Stirling and Bridge of Allan.

The Covenanters' Country and Avondale:
Lesmahagow, Blackwood, Stonehouse & Strathaven.

The Cunninghame Coast:
Saltcoats, Ardrossan and Irvine.

The Mearns of Renfrewshire:
Whitecraigs, Patterton and Uplawmoor.

The Trossachs Gateway:
Dunblane, Doune and Callander.

The Threshold of the Highlands in Strathearn:
Gleneagles, Auchterarder, Crieff & Comrie.

The Orchard of the Clyde Valley:
Lanark, Carluke, Braidwood and Crossford.

ON

THE CALEDONIAN RAILWAY
THE TRUE LINE TO COUNTRY LIFE.

Ask at Caledonian Stations and Offices for Folders giving information regarding TRAIN SERVICE and FARES

GLASGOW, 1912. DONALD A. MATHESON, General Manager.

A POSTER THAT ATTRACTS GENERAL ATTENTION.
The clever phrasing, the styles of type, together with the colours of the inks and paper, produce a most artistic mural announcement.

During the past five years most of the old underbridges on the system have been renewed largely with steel superstructures in place of the old cast iron girders; and at Stirling and Uddingston the bridges over the rivers Forth and Clyde respectively have been entirely rebuilt in substantial and attractive form; the former is illustrated on page 288.

The reconstruction of the Goods Station at Aberdeen, the northern terminus, includes a new shed 320 feet long by 260 feet wide, as well as fish and other loading banks, while greatly increased siding accommodation has been provided alongside the line at Craiginches. Buchanan Street Goods Station, Glasgow, which is the largest Goods Station on the Company's system, has been considerably extended, the extension including the construction of a large Goods Shed, well equipped with electric cranes, and all modern improvements. Additional cart-ways and sidings have also been provided, and the construction of these has necessitated the erection of a new bridge carrying the thoroughfare of Dobbies Loan.

Prominent among the many remodelled and extended passenger stations stands out Buchanan Street, where the improvements in the accommodation and appearance assume the form of something approaching a transformation. Features of the work are the commodious concourse and booking hall with an island booking office.

Worthy of note in connection with the permanent way is the innovation of expert inspection in all stages of manufacture, as well as in the after treatment of straightening, of the Company's standard running rails, which, it has also to be mentioned, are now being rolled in 48-feet lengths instead of 32 feet as formerly.

A RECENTLY ISSUED WEST COAST ROUTE PICTURE POSTER.

PASSENGER DEPARTMENT.

In the Passenger Department, twentieth century developments of considerable magnitude fall to be chronicled.

Greatly appreciated advances in speed, comfort and convenience have been effected in long distance traffic, particularly on the express service between Glasgow and Edinburgh and Perth, Dundee and Aberdeen. Old-established trains have been accelerated, additional expresses inaugurated, and breakfast, luncheon, dinner and tea cars, as well as the famed "Grampian" Corridor Coaches, introduced. The services between Glasgow and Edinburgh and Oban, between Glasgow and Edinburgh, and on the coast sections have also benefited by the accession of luxurious new rolling stock.

The most pronounced feature in recent years has been the development of long distance residential traffic within a radius of 60 miles of Glasgow and Edinburgh, and also in the Dundee and Aberdeen districts, the chief centres on the system. The running of sumptuous and speedy non-stop corridor residential trains at cheap "season" rates and at convenient hours, long in advance of what the actual traffic warranted, fostered this new movement, which, though still in its infancy, already produces revenue that has multiplied four-fold during the past three years. So promising does the Company regard this scheme that it now announces that all-the-year-round standard trains at convenient hours, morning and night, will be run to and from the residential districts within daily travelling distance of Glasgow.

That the short distance suburbanite has also been assiduously and successfully catered for is fully evidenced by the astonishing recovery made from the inroads of electric tramway and motor opposition. The point is well illustrated by the case of Glasgow. At the beginning of the century the Company had a lucrative suburban traffic at no fewer than 40 stations in and around that city, unequalled in volume outside London, until the advent of tramway competition played sad havoc with it, and necessitated the most strenuous efforts at finding a remedy. It is pleasing to report that in face of the almost overwhelming rivalry of what is recognised as one of the finest tramway systems in the world, the Caledonian Railway's Glasgow and Cathcart circle line shews a steady increase in prosperity.

INTERIOR OF PERTH GENERAL STATION.

It was in 1904 that the Caledonian Railway introduced its now well-known zone system of weekly "seasons" for the daily traveller, first on the Glasgow and Cambuslang section, a distance of five miles embracing ten stations, where unlimited travelling could be done from Monday morning till Saturday night for the modest fares of 2s. 6d. first and 1s. 6d. third class. The concession immediately became popular and was subsequently extended with equal success between Port Glasgow, Greenock and Gourock. Now, practically, every Glasgow and Edinburgh suburban resident enjoys this privilege. An idea of the extent to which these weekly tickets have grown in public favour is afforded by the fact that the revenue arising from them has increased from about £4,000 in the first year of their operation to over £20,000 per annum at the present time.

In 1905 the Company instituted cheap summer weekly excursions from its principal stations to London and the chief English cities, towns and seaside resorts, and *vice versa*, which have been enthusiastically patronised, and have been the means of opening up new fields for holiday-makers. So much so, that every Saturday morning in the holiday season direct "specials" from Liverpool, Manchester, and other Lancashire centres bring thousands of trippers to the Caledonian Railway's piers on the Clyde.

As a concrete example of the Lancashire man's insatiable love of traversing the greatest distance possible in a limited time, it may be mentioned that one Friday night at 11 o'clock during the 1912 summer a party of 500 left a station on the Lancashire and Yorkshire Railway per special train for Edinburgh (Princes Street), which they reached at 5.0 a.m. Breakfast past, another special train took them to Leith where they boarded a special steamer for the Forth Bridge. After inspecting it they left by a special train on a two-hours' run across country to Gourock. Here they took passage in one of the Company's steamers bound for Rothesay, lunch being served *en route*. Having taken part in the Saturday afternoon amusements of "The Madeira of Scotland," they commenced the return journey at 7 o'clock. A break was made at Glasgow to admit of "seeing the sights," and it was not until 11.30 p.m. that the homeward going train steamed out of Glasgow Central station. Incredible as it may seem, the whole of this travelling can be accomplished for a railway fare of 8s. 6d.—a fact responsible for the ever-increasing popularity of these extended outings. But the instance quoted by no means constitutes a distance record in day excursions. Recently a party numbering about 1,000 travelled from Preston to Gourock, sailed *via* Crinan Canal to Oban and spent the afternoon there, returning the same night by the mail train, having travelled 510 miles by rail and close on 100 miles by sea.

THE GOLFING GIRL
HER WINNING WAY
PLAYING THE GAME ON THE TRUE LINE
A TRUE LINE PUTT
"ONE UP"
THE GOLFING GIRL AND ALL HER FRIENDS PLAY GOOD GOLF ON ALL THE GOLF COURSES OF THE DISTRICTS SERVED BY
THE CALEDONIAN RAILWAY

AN INVITATION THAT NO SCOTSMAN—OR OTHER MAN—CAN RESIST.

Since 1901 the Company's fleet of steam packets, plying from Gourock, Wemyss Bay and Ardrossan has been augmented by two paddle steamers, each having a speed of over seventeen knots and with accommodation for 1,400 passengers, and in 1906 was added the turbined-engine *Duchess of Argyll*,* with a speed of 21 knots per hour, and carrying 1,800 passengers. Illustrative of the rapidity with which traffic is transferred it may be mentioned that at Gourock several vessels may be despatched within three minutes of a train's arrival, and 1,500 passengers can be disembarked from a steamer in four minutes. The fact that the *Duchess of Hamilton*, built in 1890 and still a favourite, if re-placed to-day would be on the same lines and general arrangement, is indicative of the ability and care exercised in the designing and maintaining of this famed fleet.

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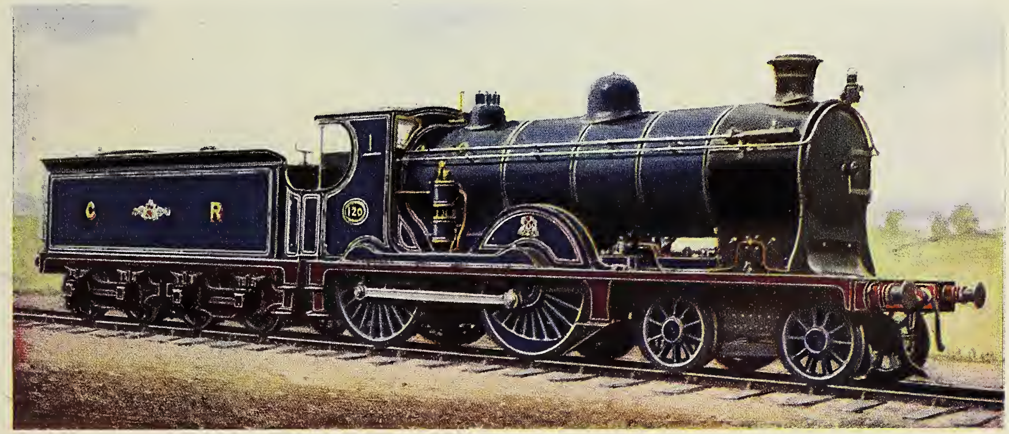
* A coloured picture of the *Duchess of Argyll* forms the frontispiece of this number of the RAILWAY AND TRAVEL MONTHLY.

But with the welcome increase of business by rail and by steamer the Company's advertising enterprise has much to do. Not that the Caledonian Railway had ever failed to utilise to the utmost all the recognised channels of publicity. Indeed, besides being very early in the field with lantern lectures and cinematograph displays, it was the pioneer of co-operative advertising, and furthermore it holds the unique distinction of having persuaded the public to buy and hang in their homes framed replicas of two of their pictorial posters.

Before finally embarking on its new era of publicity the Company studied well what to advertise and how best to do it. The problem was narrowed down by the decision to focus efforts specially on holiday and long-distance residential traffic, and by the determination to excel in the production of poster and other announcements which people would find it impossible to ignore. This new impetus was heralded by the adoption of a distinctive and yet appropriate sub-title for the Caledonian Railway's system. Thus emerged the *True Line*, a happily chosen phrase that at once caught the public fancy like the refrain of a popular song. The introduction of the appellation and the accompanying intimation that passengers by it travelled with *True Convenience*, *True Comfort*, *True Economy*, and *True to Time* arrested attention by its boldness. Criticism was, of course, rife, but each of the series of "telling" posters that followed was read by even the least observant, and the announcements of some were actually memorised.



4-4-0 LOCOMOTIVE NO. 120, THE LATEST TYPE OF EXPRESS ENGINE ON THE CALEDONIAN RAILWAY.
Fitted with the Robinson Superheater.

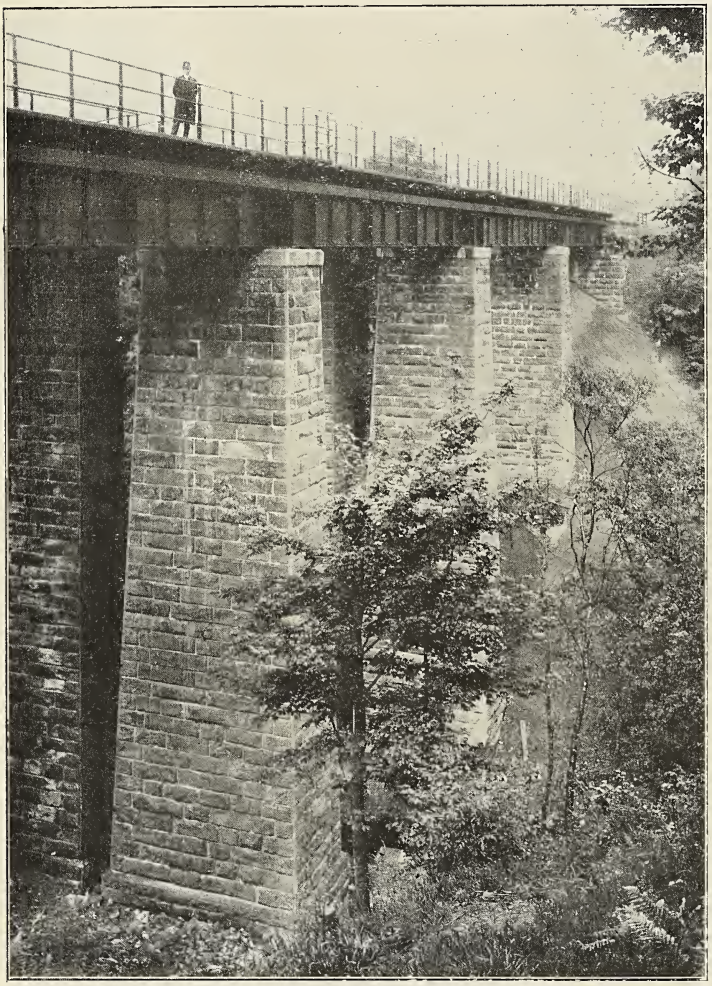
As will be seen from the several reduced *facsimile* examples reproduced in this article, their characteristics beyond mere artistic merit are their refreshing originality, and the genuineness of their appeal, at once suggestive, persuasive, and travel-compelling, and betoken the fastidious taste exercised in their production, down to the detail of display. To but glance at "The Golfing Girl"—to mention only one of the charming productions—is to fall an easy and not unwilling prey to the vogue of golf.

The attractions of the picturesque Oban route, the ever fascinating Clyde Coast and other places on the line, are depicted alluringly at home and abroad, and the charms of the English and Welsh Watering Places concurrently and correspondingly emphasised, thus creating a flow of holiday-makers in either direction, and at the same time popularising Scotland to its dwellers as it has never been done before.

As regards long distance residential daily travelling, the people have had their attention insistently though gracefully drawn to what the Company has designated the "*Delightful Districts*," with the result that many have been converted to belief in the country life; families previously in the habit of contenting themselves with a short stay of a week or two now remain months; others again have taken to all-the-year residence in coast or country homes. But after all is said this effect should not create surprise when it is coupled with such places as Crieff, Crawford, Callander, Dunblane, Lanark and Moffat.

The Caledonian Railway is singularly fortunate in its wealth of attractive health and pleasure resorts, and its numerous residential districts within easy reach of daily travel from the principal cities.

To-day, north of the border, the Company's system is as often spoken of as the "True Line" as by its real name—a compliment indeed. Meantime the management continues to busy itself in forecasting to where the public should travel, and they on their part, thankful for having their minds made up for them, cheerfully go.



THE DAFF VIADUCT, NEAR INVERKIP.

MERCHANDISE AND MINERALS.

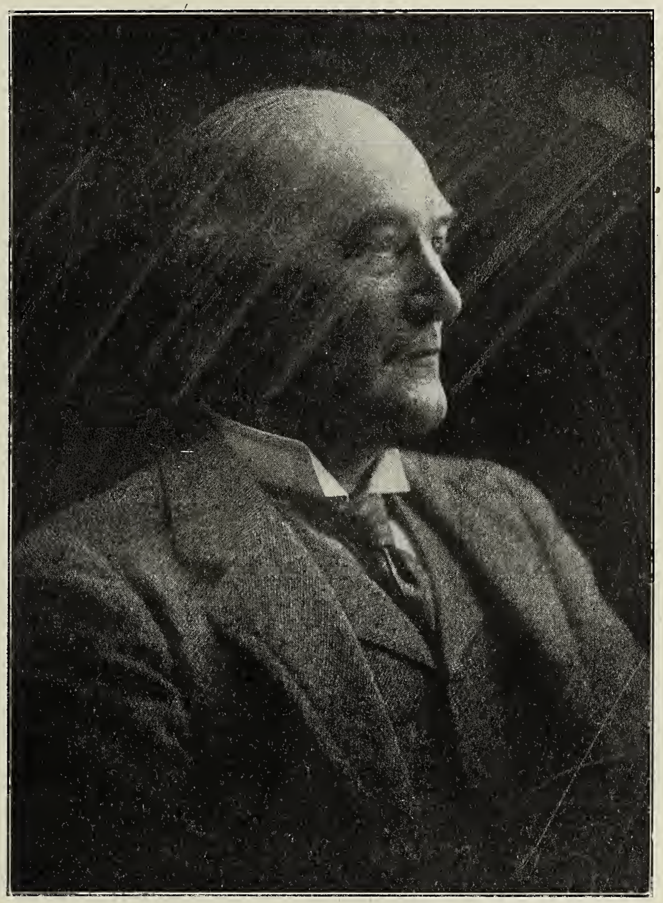
The Merchandise and Mineral department, naturally the least susceptible to striking developments, has an interesting story to tell of progress in quite a number of directions, with the view of increasing the efficiency of service and reducing the operating and maintenance expenses.

The ushering in of the century witnessed a beginning of the wholesale abolition throughout the system of the old six and seven ton trucks that had so long served the purpose on the railways of this country; the raising of the capacity of all the approved existing classes of wagons and vans; and the creating of new standard classes to meet the ever changing requirements of trade. All the while the matter of having the ratio of tare at the lowest point attainable has been kept constantly in view.

Supplementary to this there has been a continuance of the policy of providing specially designed vehicles, not only to meet the wants of established businesses, but to encourage and foster new industries in which the element of safe and speedy transit plays so important a part.

In the conveyance of articles of unusual length, or weight, or of exceptional bulk in proportion to weight, the present-day demands, although admittedly much more complex than ever before, are never at any time found to be beyond the resources of the Caledonian Railway, let the consignment be an 80-ton casting, 90-feet logs, or say a Dreadnought's gun of the latest and largest pattern—the latter representing an important class of traffic now closely identified with the Caledonian Railway. Of wagons suited for these and other abnormal loads the Company now possesses the substantial stock of 1,135, in more or less constant demand.

Special attention has, during the past dozen years, been given to the minimising of unproductive mileage and shunting, and to the best possible loading of wagons; and in the latter connection extensive use is being made of 30-ton wagons in the conveyance of goods between large centres, where full loads in either direction are obtainable. The average carrying capacity of the Company's goods wagons is now 8·32 tons, compared with 8 tons in 1900, and of the mineral wagons 10·27 tons, as against 7·39 tons twelve years ago.



SIR CHARLES BINE RENSHAW, BART.,
Chairman, Caledonian Railway.

But the achievement of greatest moment is the completion (in October, 1906) of the Company's new Dock at Grangemouth — by far the largest railway-owned port and with the finest dock appliances in Scotland. Its quayage is extensive, the storage commodious, and the facilities for expeditious loading and discharge abundant, the equipment including steam and hydraulic cranes, hoists, shoots and capstans of the most modern types. The hydraulic hoists are each capable of shipping fifty wagons per hour, and some of them being movable can so be placed as to permit of three hoists working simultaneously into a vessel when necessary. The weighing machines connected with all the hoists can weigh traffic alongside on shipment and show the gross tare and nett weight of each wagon when desired. The sea-lock on the Firth of Forth, which is 626 feet long by 80 feet wide, gives direct and easy access to vessels of the largest size drawing up to 26 feet of water. The docks are lighted throughout by electricity, and the many miles of dock lines and sidings are in direct rail communication with all parts of the United Kingdom.

Grangemouth has a great advantage over other ports doing a purely import trade, because an outward cargo can generally be obtained.

Under the enlightened policy pursued by the Caledonian Railway Company, the harbour and the whole dependent community of Grangemouth are assured of ever-increasing prosperity.

LOCOMOTIVES, CARRIAGES AND WAGONS.

In its Locomotive, Carriage and Wagon Departments the twentieth century on the Caledonian Railway has assuredly spelt *PROGRESS*.

The standard goods wagon has been improved to carry 10 tons, the 8-ton pig-iron wagon to 16 tons, the 10-ton mineral wagon to 12 tons, and the 6-ton covered goods van to 10 tons. New 20-ton goods brake vans have been provided for trains loaded beyond the scope of the standard 15-ton van. In 1901 was introduced the 30-ton all-steel four-wheeled bogie wagon having a capacity of 1,200 cubic feet; and in 1905 appeared the 30-ton bogie swivel wagon, 45 feet long by 8 feet wide, for carrying rails and long bars in safer and more convenient fashion than by coupling together small swivel wagons. These are popularly known as "Gondola" wagons, and they are in such demand that a large additional number of 35 tons capacity are at present being built.

EGLINTON STREET STATION, GLASGOW.

Other developments include three trains of hopper ballast wagons, each having the special design of brake van with steel slag-spreading plough at either end, illustrated on page 290; cattle boxes with grooms' compartment, for conveying "prize" and other valuable animals; six-stalled horse boxes with compartment for groom and harness; 7-ton steel gunpowder vans, superseding the zinc-lined wooden vans; refrigerator meat vans; 20 and 40-ton hopper bottom ore and coal wagons, and numerous designs of trucks and trollies of 12 to 40-ton capacity, for exceptional loads.

The now famous "Grampian" side-corridor carriages, measuring 65 feet long by 9 feet wide, and carried on two six-wheeled bogies, made their appearance in 1904, and at once leapt into public favour by reason of their complete down-to-dateness. During the same year came non-corridor carriages of the same dimensions and build, intended specially for the popular Glasgow-Edinburgh Express service.

Two years later were turned out 68-feet non-corridor third class carriages, with 11 compartments, accommodating 132 passengers.

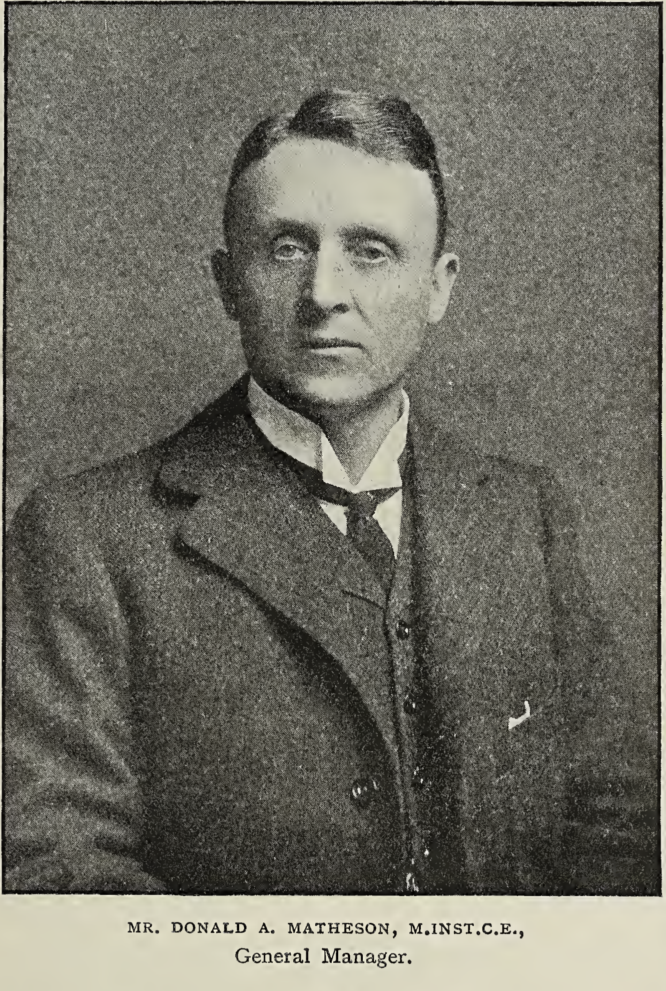
The corridor style of carriage, with 50-feet body carried on 2 four-wheeled bogies, was put on the Callander and Oban line in 1909; and last year four-wheeled-bogie corridor coaches, measuring 57 feet over the body, were built for excursion traffic to and from England, and proving exceedingly popular a further lot was added to the stock for purely Scotch traffic.

This year, the Caledonian Railway has built some third class corridor picnic carriages, each provided with a kitchen compartment in which the attendant prepares and serves tea, etc. *en route* to the passengers on excursion trains to England.

There has also been placed on the line during this period two Refreshment Cars, somewhat similar to those in use on other first class railways, and 50-feet third class corridor saloons; also the 30-horse power petrol driven rail char-a-banc, illustrated on page 292, with trailer for the conveyance of passengers and motor cars by intermittent service between the regular locomotive-worked trains, across the cantilever bridge at Loch Etive in Argyllshire.

All the Company's standard carriages are now constructed with steel underframes; new carriage stock is lit by electricity, and in the older coaches incandescent lighting is extensively in operation.

Train steam heating and the provision of hot water in the lavatories has also been greatly extended during the past eleven years, including the fitting of this convenience to many of the older carriages.

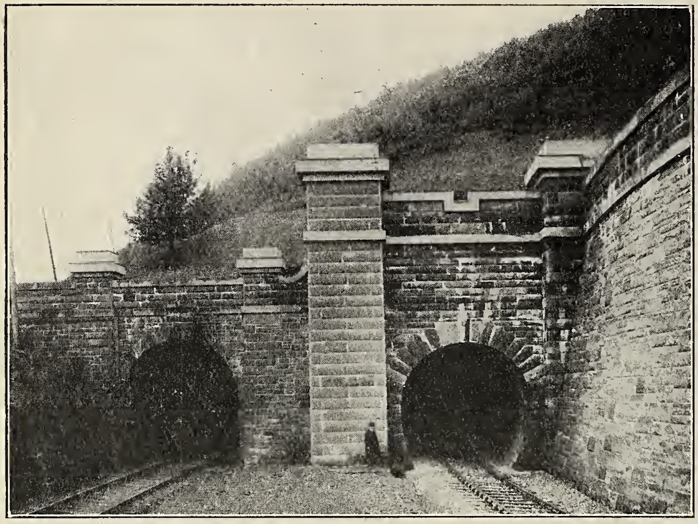


MR. DONALD A. MATHESON, M.INST.C.E.,
General Manager.

As to locomotives, the advance made during the past few years, particularly towards making the engine suit the load, is unequalled by any other railway in the country.

In 1900 came the 900 Passenger class (19 in. by 26 in. by 6 ft. 6 in.), with still more ample boiler, augmented heating surface, and longer wheel base than the *Improved Dunalastairs* and accompanied by the bogie tender which had made its first appearance in the 766 class.

For better negotiating the steep gradients and severe curves abounding on the Callander—Oban Line, the powerful 55 Passenger class (19 in. by 26 in. by 5 ft. 0 in.) was brought out in 1902.



THE OLD AND NEW TUNNELS AT INVERKIP, WEMYSS BAY BRANCH

This formed the introduction into the country of a completely new type of 6-coupled bogie engine with inside cylinders driving on to the leading axle,—a design that has since been adopted with excellent results on the London and North-Western and other British railways.

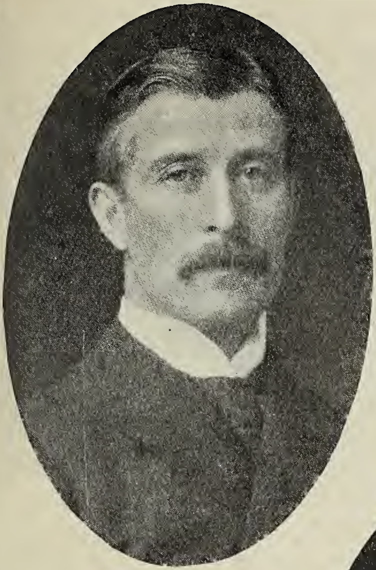
So satisfactory was its working that a heavier 6-coupled engine, on similar lines, the 49 Passenger class (20½ in. by 26 in. by 6 ft. 6 in.) followed within a year, for the exclusive work of running the 2.0 p.m. *ex* Euston and Glasgow (Central) Corridor Dining trains between Carlisle and Glasgow. In this class the abnormal dimensions of the cylinders necessitated placing the slide valves on top, an arrangement since repeated in all subsequent engines having large cylinders.

The familiar *Cardean*, 903 Passenger class (20 in. by 26 in. by 6 ft. 6 in.), weighing in working order along with tender 130 tons, which came out in 1906, was the product of a couple of years' working of No. 49 and her sister engine the *Sir James Thompson*. It had the enormous heating surface of 2,260 square feet, a grate area of 26 square feet, a tractive force of 21,333 lbs. and a working pressure of 200 lbs. per square inch.

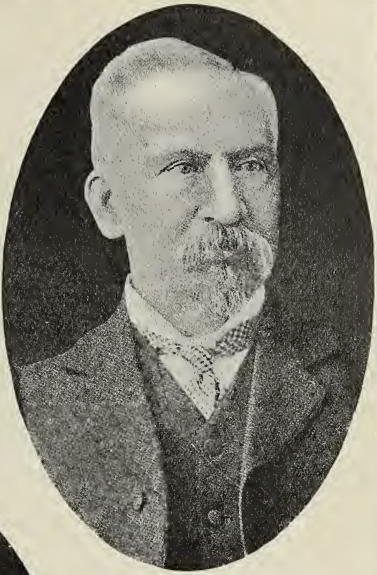
Up till 1904 the engines used for general passenger traffic had been the 900 class of 4-coupled bogies, but in that year the more powerful 140 Passenger class (19 in. by 26 in. by 6 ft. 6 in.) was built for that work, and, except for the 2.0 p.m. Diner *ex* Euston and Glasgow, still remains the standard, being the most suitable engine for high speeds apart from particularly heavy loads. A subsequent modification of this class, embodying the application of superheated steam, appeared first in Engine No. 139.

Two years later came the 908 Passenger class (19 in. by 26 in. by 5 ft. 9 in.),

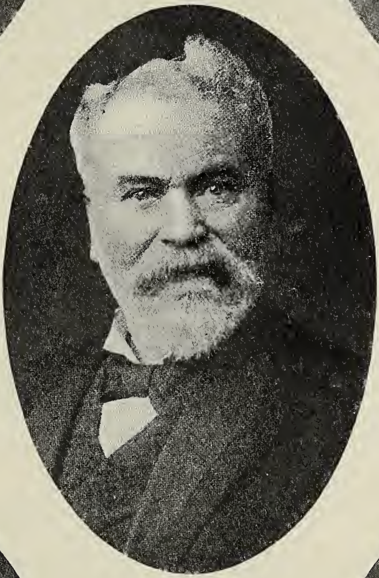
INVERKIP STATION.



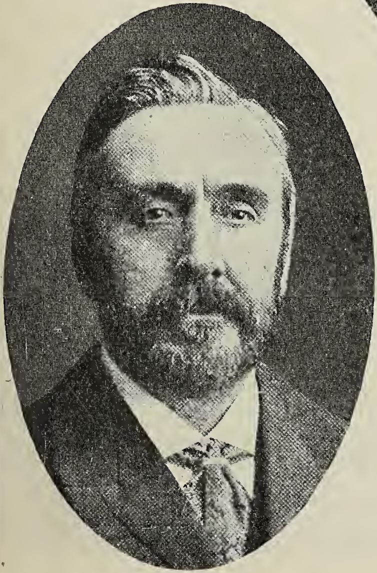
MR. JOHN BLACKBURN,
Secretary.



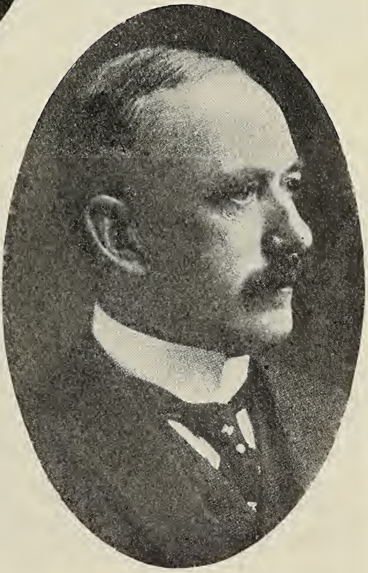
MR. MATTHEW WADDELL,
General Goods Manager.



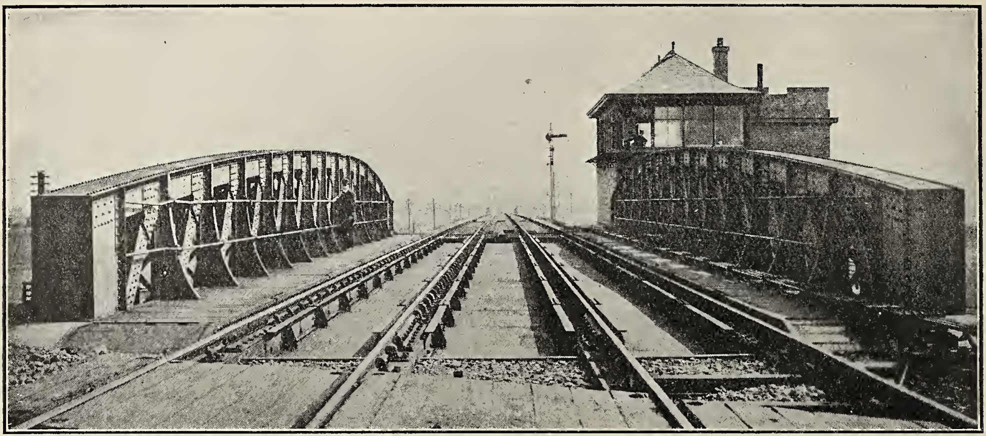
MR. J. F. M'INTOSH,
Locomotive Supt.



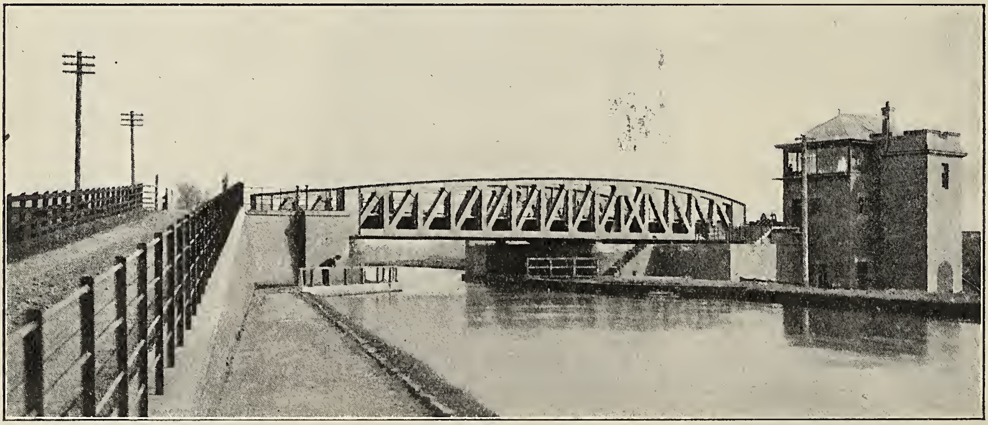
MR. T. W. PETTIGREW,
General Superintendent.



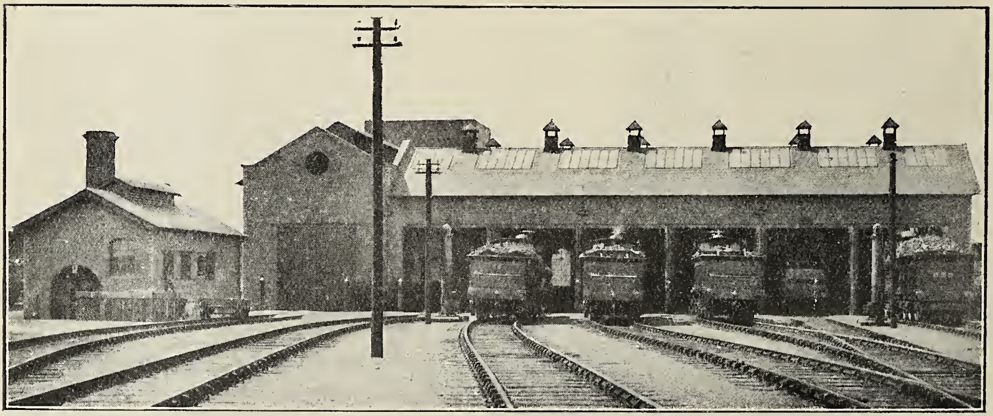
MR. W. A. PATERSON, M. Inst. C.E.,
Engineer-in-Chief.



THE SWING BRIDGE AT GRAHAMSTON, FROM RAIL LEVEL.



THE SWING BRIDGE AT GRAHAMSTON, WITH POWER HOUSE TO THE RIGHT.



THE NEW ENGINE SHEDS AT GRANGEMOUTH.

'TWIXT MOUNTAIN AND LAKE: ST. FILLANS STATION.

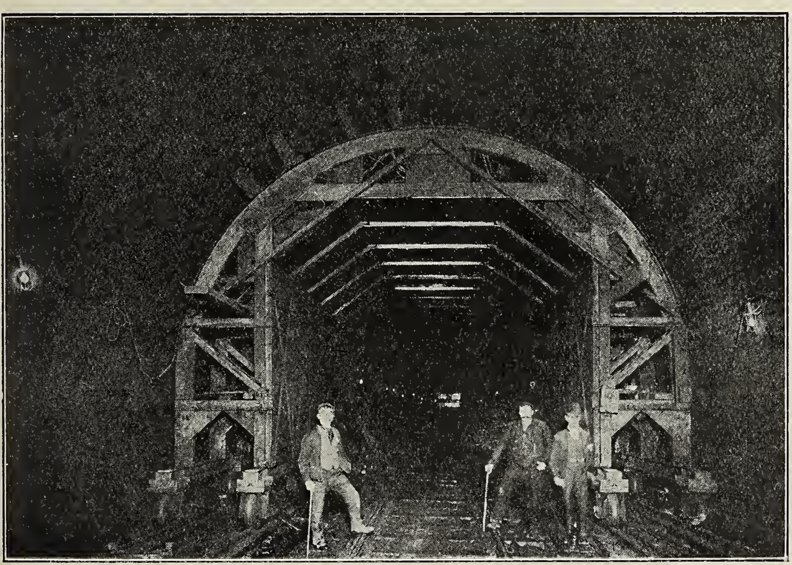
intended for specially heavy trains, and largely employed in the express service between Glasgow, Perth and the North.

Early in the present year appeared a very important advance on the 812 Passenger-Goods class, entailing re-arrangement of boiler heating surface, enlargement of cylinders and the provision of piston valves and increased bearings, viz. the superheated 30 class (19½ in. by 26 in. by 5 ft. 0 in.), these being the first engines not entirely confined to passenger traffic to be so equipped.

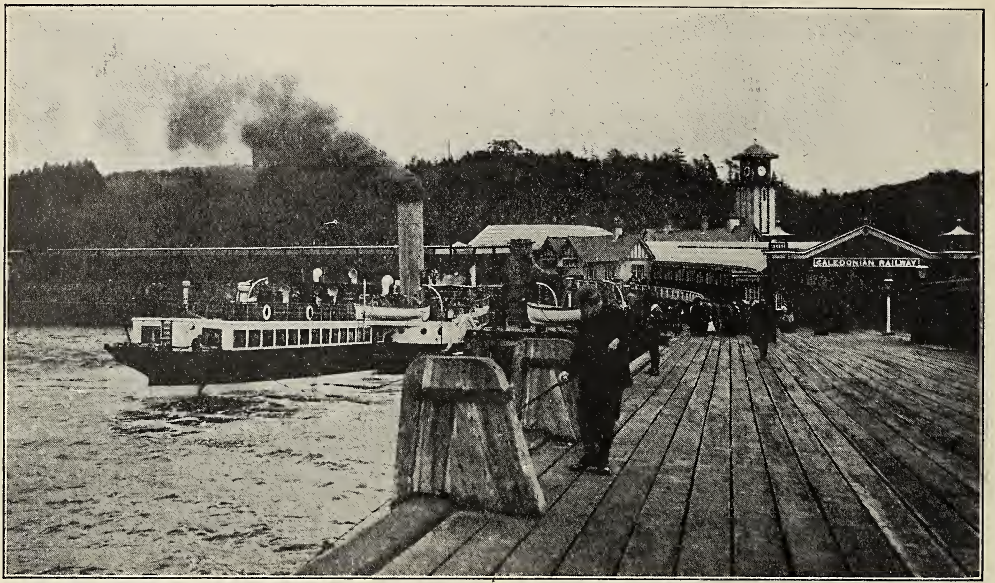
In 1906 was put on the line a new class of express goods, the 918 class (19 in. by 26 in. by 5 ft. 0 in.) 6-coupled, this being the first purely goods engine of the Caledonian Railway having a bogie, and calls for special comment on account of its unusually ample heating surface of 2,018 square feet.

With the introduction of high capacity coal wagons a larger type of mineral engine was required, and to meet this want the 600 class (21 in. by 26 in. by 4 ft. 6 in.) 8-coupled, was built in 1901, with the very large heating surface of 2,108 square feet, and 26,276 lbs. tractive force. These engines, it may be remarked, can take at good speeds and with perfect ease 60 fully loaded wagons, indeed, there is sometimes difficulty in getting sufficient siding accommodation for the length of trains they can work.

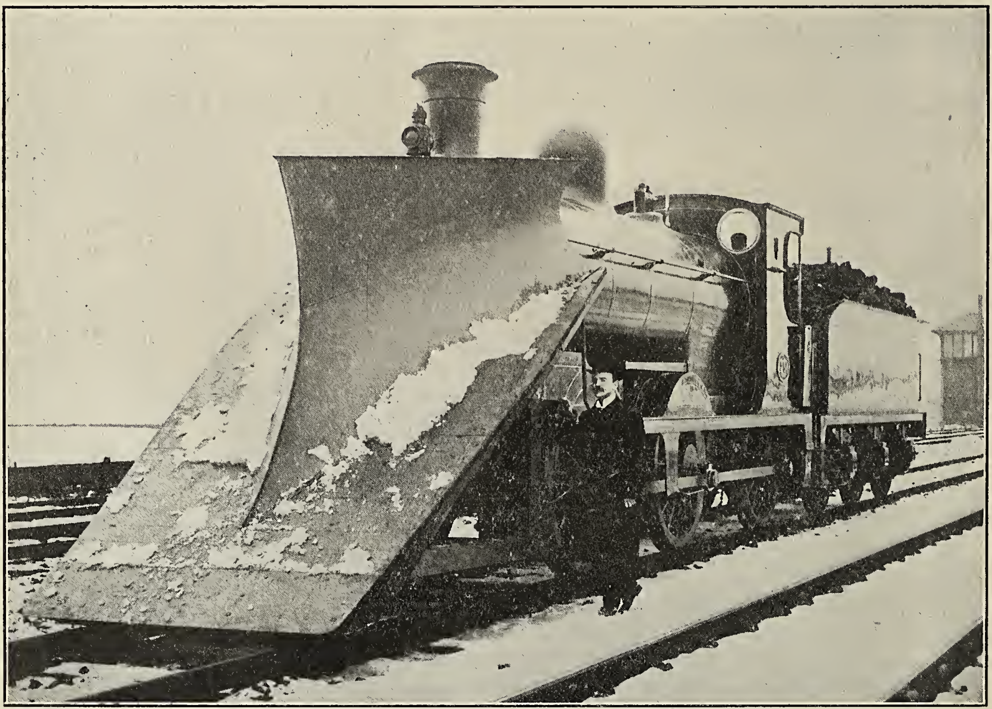
A new design of 8-coupled mineral tank engine, the 492 class (19 in. by 26 in. by 4 ft. 6 in.), having larger cylinders and boiler than



RELINING THE MONCRIEFF TUNNEL, PERTH, SHOWING THE MOVING STAGING EMPLOYED.



CALEDONIAN RAILWAY STEAMER ALONGSIDE WEMYSS BAY PIER.



ONE OF THE CALEDONIAN RAILWAY'S SNOW PLOUGHS.

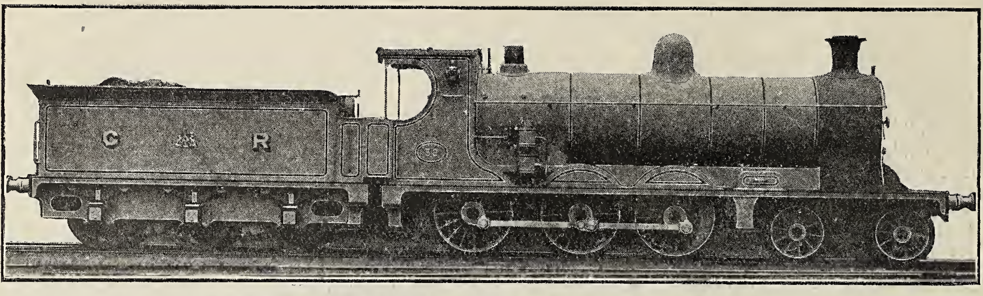
the 782 class, was brought into use in 1903. But the most important innovation in Caledonian Railway locomotive practice in recent years is Superheating. The new idea—new, however, only in the sense of being the revival in an improved form of a very old one, as in the case of the steam turbine—had not long been proved worthy of serious attention when the Caledonian Railway also determined to investigate its merits, with the result that three years ago a beginning was made in adapting engines of the 140 class to the use of superheated steam, the first engine to be so fitted being No. 139. So substantial has been the consequent economy in fuel and water that the entire 49, 903 and 30 classes, and eleven of the 140 class—22 in all—are now so equipped.

Classes 766 and 900 are also meanwhile being superheated, and as the 721 class, although built in 1896, is still in most respects up to date, it will possibly follow; and for the future it is extremely likely that all modern express passenger and goods engines used on the Caledonian Railway will conform to this principle.

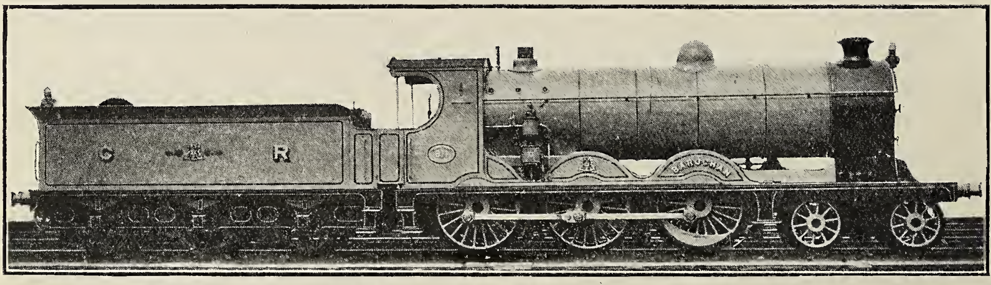
NEW YEAR'S DAY HOLIDAY CROWD AT THE GLASGOW CENTRAL STATION, 1899.

In 1900 was adopted—for the first time on the line, and continued on all passenger engines built subsequently—the steam reversing gear, which admits of easier adjustment of the valves to suit the varying requirements of running than the old hand lever and is an inducement for enginemen to use it more frequently in the fuel-economising operation known as "notching up." In this arrangement the hand lever and notch-plate are retained for locking the gear, and for emergency use should the steam apparatus fail.

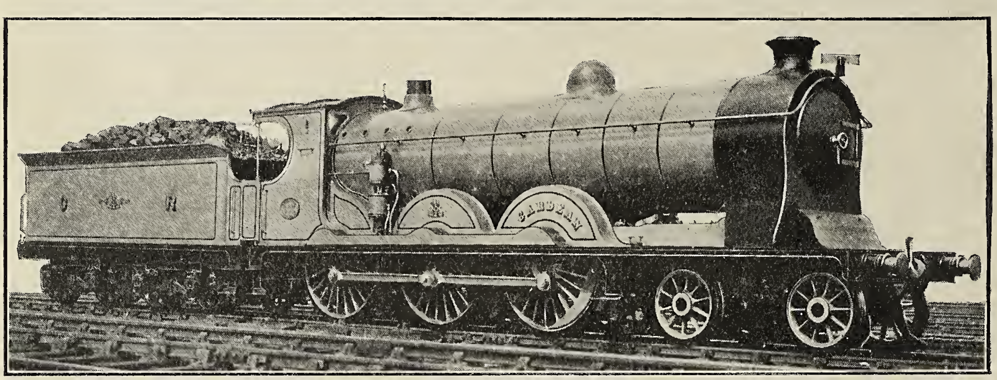
Five years ago the Company supplemented the breakdown appliances by the addition of two twenty-ton self-propelled steam breakdown cranes, having a maximum radius of 21 feet with full load, and a pair of high pressure reversing engines 8 inches



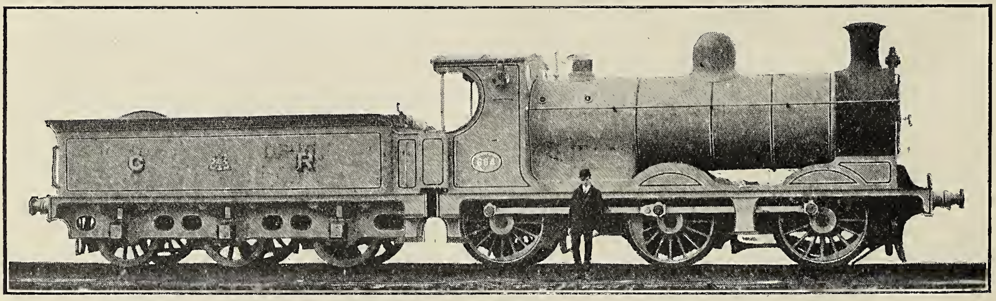
NO. 58, 4–6–0 EXPRESS LOCOMOTIVE FOR THE OBAN LINE.
Coupled wheels, 5 ft. diameter; cylinders, 19 in. × 26 in. stroke.



Barochan, 4–6–0 EXPRESS LOCOMOTIVE FOR THE CLYDE COAST TRAFFIC.
Coupled wheels, 5 ft. 9 in. diameter; cylinders, 19 in. × 26 in. stroke.



Cardean, 4–6–0 EXPRESS LOCOMOTIVE.
Coupled wheels, 6 ft. 6 in. diameter; cylinders, 20 in. × 26 in. stroke.



NO. 664, 0–6–0 LOCOMOTIVE FOR PASSENGER AND EXPRESS GOODS SERVICE.
Coupled wheels, 5 feet diameter; cylinders, 19½ in. × 26 in. stroke.

SOME TYPES OF THE CALEDONIAN RAILWAY'S 20TH CENTURY LOCOMOTIVES.

diameter by 14-inch stroke working the motions for hoisting, sluing, derricking and propelling.

In 1907 was introduced the greatly improved design of single-line snow plough of the utmost dimensions available for the standard gauge, illustrated on page 284; and during the past twelve years finely equipped Running Sheds have been erected at Aberdeen, Edinburgh and Grangemouth—the last illustrated on page 282.

All the engines built during the present century are equipped with the most approved spark arrestor for controlling the emission of live sparks and improving the steaming of the engine; and although the Caledonian Railway, as a rule, does not name its locomotives, four of those turned out in recent years have been treated as exceptions to the rule, viz.—

Barochan (No. 911), named after the Renfrewshire estate of Sir Charles Bine Renshaw, Chairman of Directors.

Cardean (No. 903), after the estate of Mr. Edward Cox, Deputy Chairman.

GLASGOW SPRING HOLIDAY, 1912.

A few of the passengers the Caledonian Railway carried on that day, at the Central Station, Glasgow.

Sir James Thompson (No. 50), after a former General Manager and Chairman of the Company.

Sir James King (No. 909), after the Company's late Chairman of Directors.

If the Caledonian Railway is not now always startling the railway world with locomotive developments, it is because it has for the nonce evidently exhausted the ever-decreasing possibilities; for, assuredly, no other railway can show a better, and few an equal, twentieth century record of things accomplished, and with less to regret or undo.

It is interesting to recall that His Majesty King George conferred in person last autumn the distinction of the Royal Victorian Order on the Company's Locomotive Superintendent, Mr. John F. McIntosh.

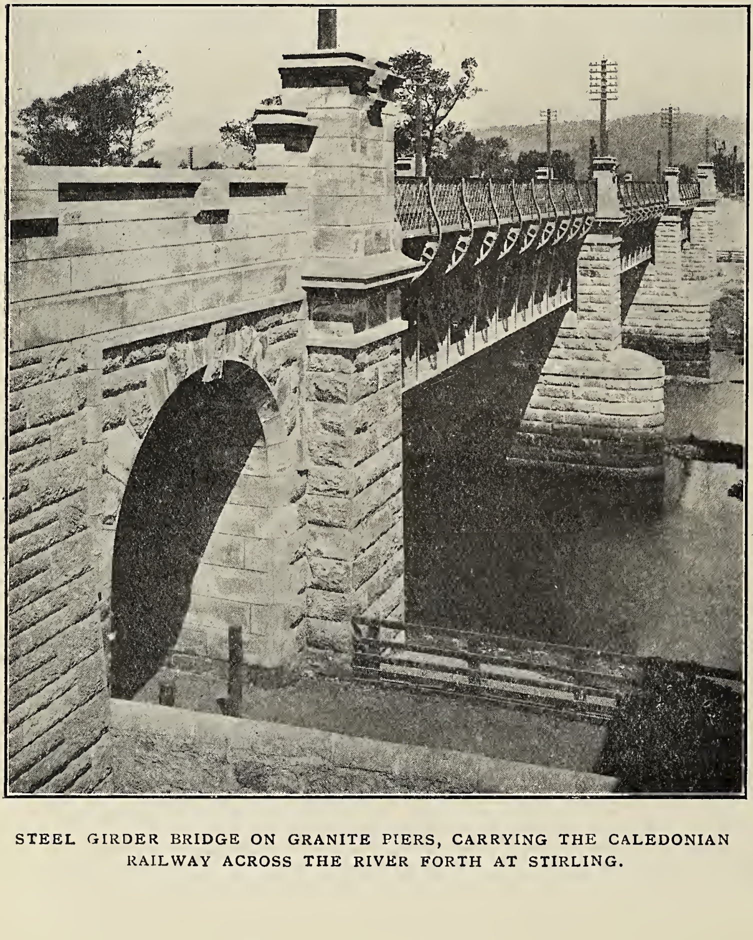
The accompanying table shows leading particulars of the engines under review.

Engines.		Cylinders.	Driving Wheels.		Total Heating Surface.	Grate Area.	Tractive Force.	Boiler Pressure.
		ins. ins.	ft.	in.	sq. ft.	sq. ft.	lbs.	lbs. per sq. in.
Passenger ..	900	19 × 26	6	6	1,540	22	17,320	180
	55	19 × 26	5	0	1,810	20·6	21,901	175
	49	20¾ × 26	6	6	2,170	26	20,093	175
	903	20¾ × 26	6	6	2,330	26	20,093	175
	140	19 × 26	6	6	1,615	21	17,320	180
	908	19 × 26	5	9	2 023	21	19,550	180
	139	20¼ × 26	6	6	1,660	21	18,590	170
Passenger-Goods	30	19½ × 26	5	0	1,457	20·6	21,090	160
Goods.. ..	918	19 × 26	5	0	1,844	21	21,901	175
Mineral ..	600	21 × 26	4	6	2,108	23	27,868	175
	492	19 × 26	4	6	1,189	19·5	22,813	175

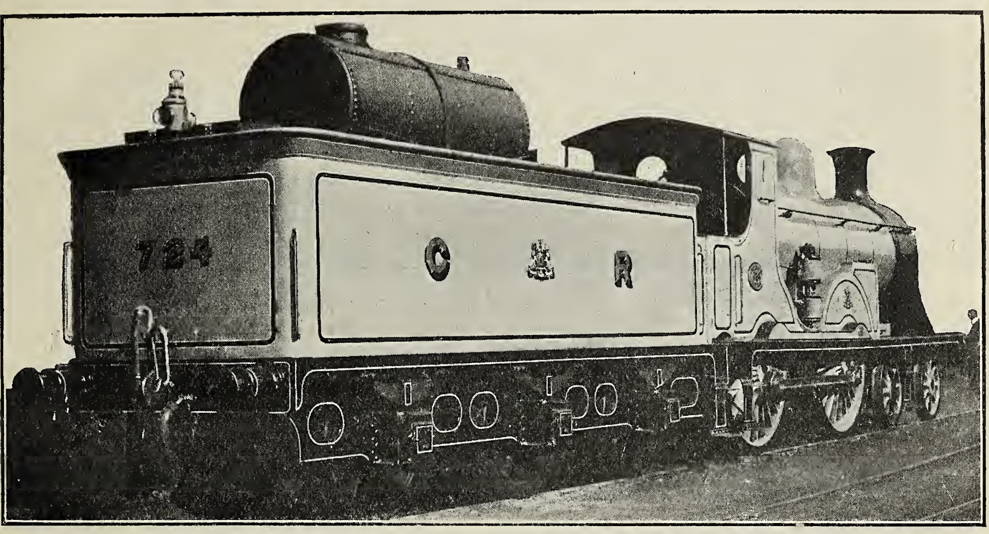
It will be noted that in classes 49 and 903 the working pressure has been reduced from 200 to 175 lbs., and that 140 has a pressure of 180 lbs. while that of 139 has been reduced to 170. This alteration is due to the introduction of superheated steam, the increased volume of which permits the use of larger cylinders, and consequently gives equivalent power with lower boiler pressure.

The destinies of the Caledonian Railway are ably controlled by Sir Charles Bine Renshaw, Bart., D.L., who, in 1908, assumed office as Chairman of the Directors. During the comparatively short interval since then Sir Charles has done a very great deal to conserve and improve the fortunes of the Company.

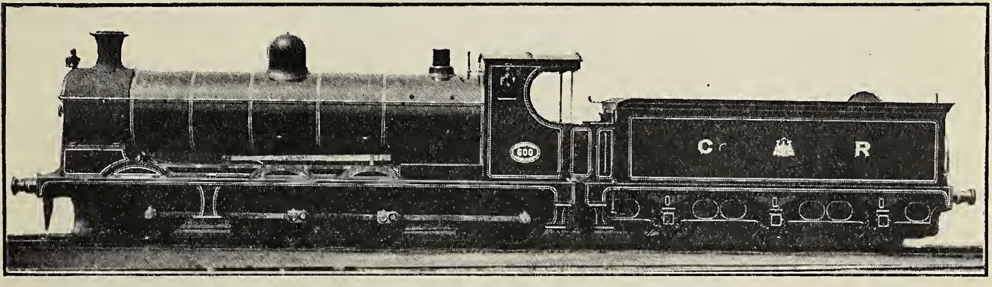
The General Manager, Mr. Donald A. Matheson, M.Inst.C.E., was appointed in October, 1910. Prior to being appointed General Manager, Mr. Matheson successively filled the positions of Resident Engineer on New Works, District Engineer in Maintenance and Engineer-in-Chief for the Company, and while acting in the last-named capacity he supervised the execution of the extensive engineering works already described in this article. In 1903 Mr. Matheson was sent by



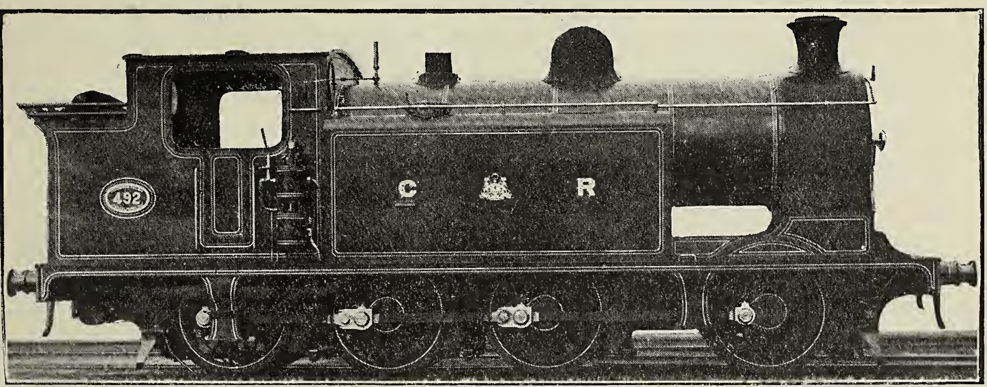
STEEL GIRDER BRIDGE ON GRANITE PIERS, CARRYING THE CALEDONIAN RAILWAY ACROSS THE RIVER FORTH AT STIRLING.



4-4-0 PASSENGER LOCOMOTIVE NO. 724, FITTED FOR BURNING OIL FUEL.

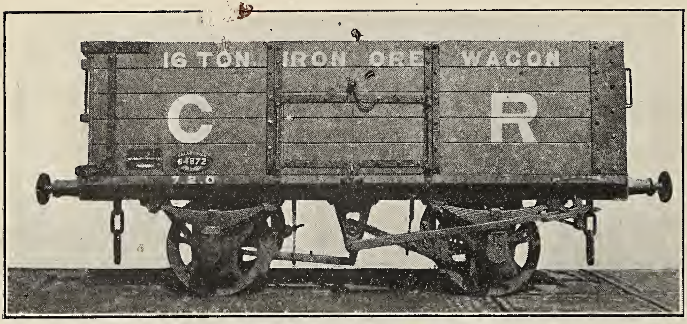


NO. 600, 0-8-0 TYPE OF GOODS LOCOMOTIVE.
Wheels, 4 ft. 6 in. diameter; cylinders, 21 in. × 26 in. stroke.

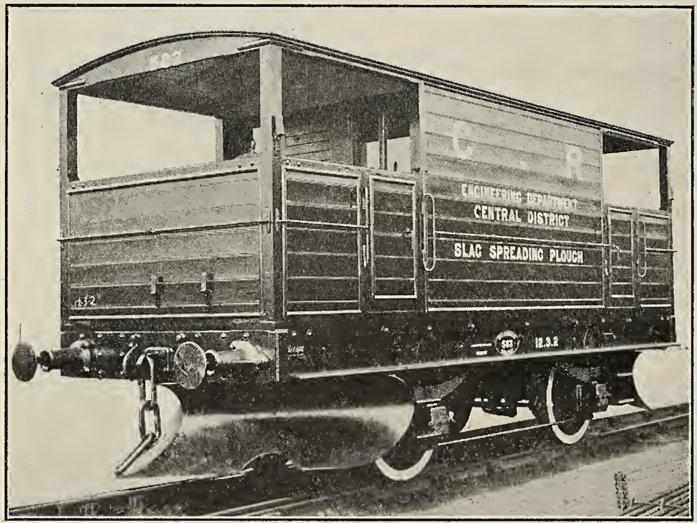


NO. 492, 0-8-0 TANK LOCOMOTIVE FOR MINERAL TRAFFIC.
Wheels, 4 ft. 6 in. diameter; cylinders, 19 in. × 26 in. stroke

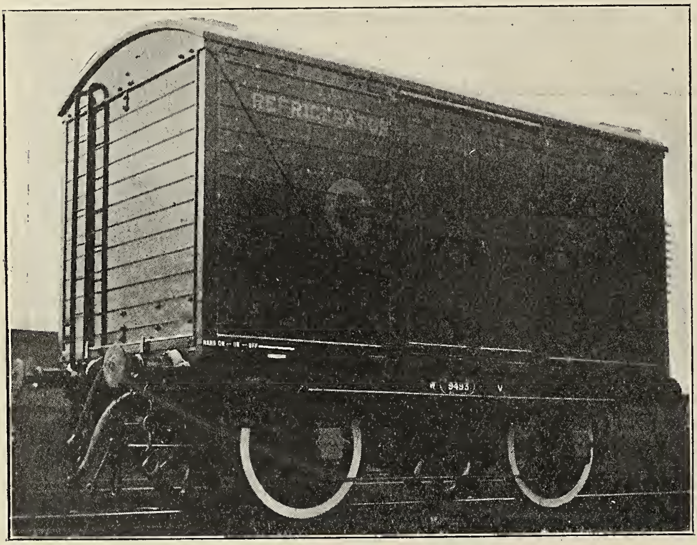
SOME MORE TYPES OF THE CALEDONIAN RAILWAY'S 20TH CENTURY LOCOMOTIVES.



16-TON FOUR-WHEEL ORE WAGON.



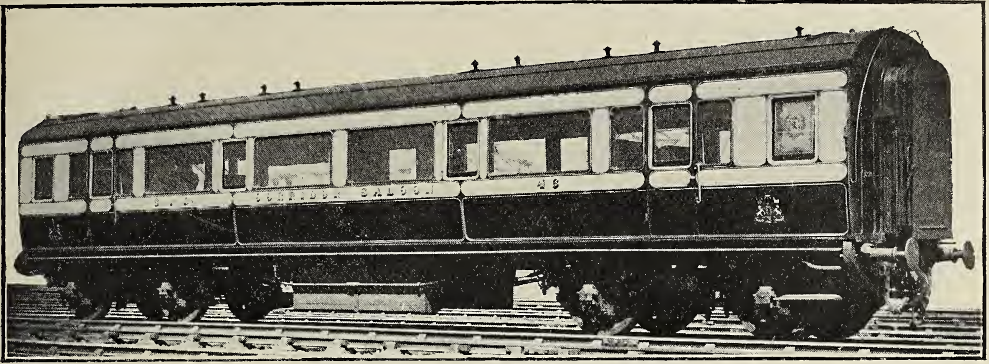
SLAG SPREADING PLOUGH FOR BALLASTING THE PERMANENT WAY.



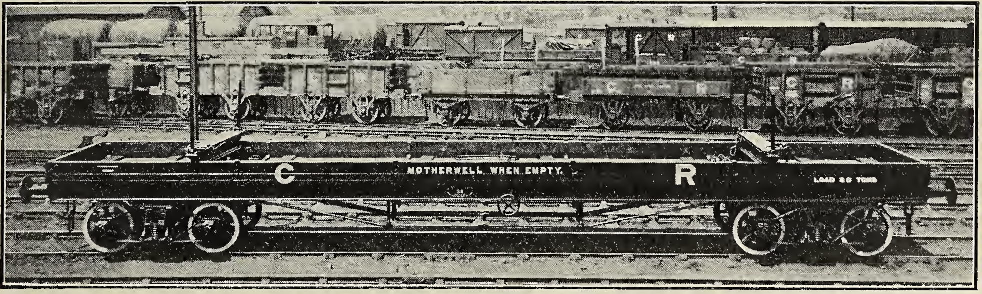
REFRIGERATOR MEAT VAN FOR WORKING ON PASSENGER AND EXPRESS GOODS TRAINS.

the Directors of the Caledonian Railway, along with other officers, to study Railway methods in the United States and Canada, and in 1910 he represented the Company at the International Railway Congress at Berne.

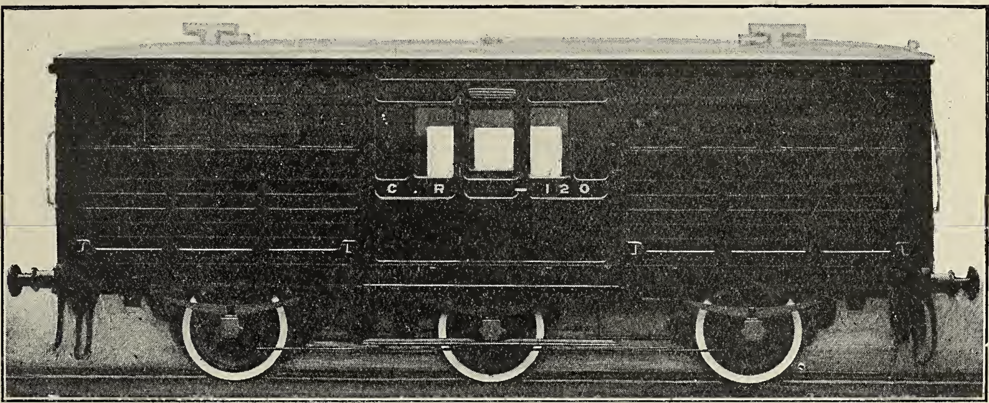
Such have been the changes in the *personnel* of the Line that only three of the chief officers now remain in the positions they occupied at the beginning of the century, namely, Mr. John Blackburn, Secretary; Mr. John F. McIntosh, Locomotive Superintendent; and Mr. W. Stevenson, Telegraph Superintendent. Mr. Matthew Waddell, General Goods Manager, succeeded Mr. Arch. Hillhouse in 1907; Mr. T. W. Pettigrew was appointed General Superintendent in succession to Mr. Guy Calthrop in 1908; and Mr. W. A. Paterson became Engineer-in-Chief in 1910. During the same period there have been changes in the positions of Solicitor, Accountant, Treasurer, Traffic Auditor, Outdoor Mineral Superintendent, Registrar, Stores Superintendent, House Factor, Carting Superintendent, Canal Manager, Signal Superintendent, Plant and Sack Superintendents, and some of the District Engineers and District Traffic Superintendents.



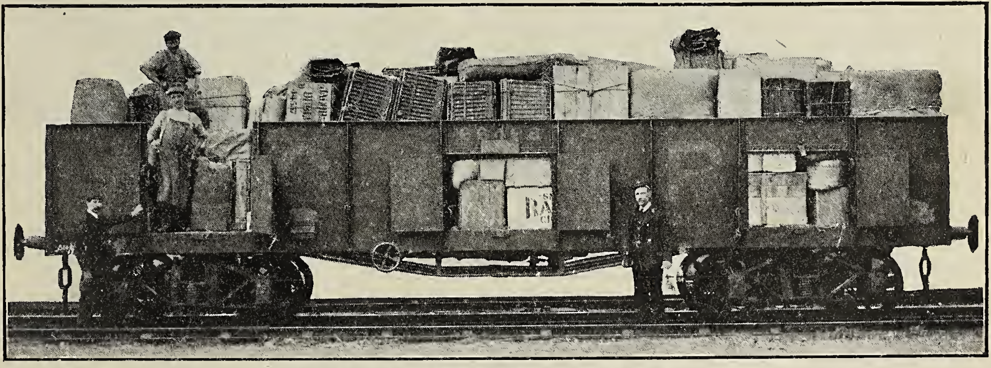
STANDARD TYPE OF CORRIDOR SALOON.



30-TON TROLLEY WAGON.



SIX-WHEEL HORSE-BOX FOR CONVEYING SIX HORSES, WITH GROOM'S COMPARTMENT IN CENTRE.



30-TON STEEL BOGIE GOODS WAGON.

The progress of the Company during the present century is shewn by the following comparative figures:

	1901.	1912.
Capital	£50,201,051	£57,349,850
Mileage of Railway — Lines owned by the Company	782 miles	876¼ miles
Mileage of Railway — ,, partly owned and worked	154 ,,	159½ ,,
Mileage of Railway — ,, worked	132 ,,	156¾ ,,
Mileage of Forth and Clyde, and Monkland Canals	52¼ ,,	52¼ ,,
Receipts:—		
Traffic	£3,968,840	£4,386,516
Miscellaneous	£86,619	£148,467
Canal	£123,695	£153,023
Total	£4,179,154	£4,688,006
Locomotive Stock	902	927
Coaching Plant Stock	2,265	2,439
Ditto Seating Capacity for Passengers	106,479	109,477
Wagon Plant Stock	62,949	55,607*
Ditto Carrying Capacity in Tons	474,082	511,541
Average earnings per Locomotive	£4,400	£4,732
Average earnings per Carriage	£721	£744
Average earnings per Wagon	£37	£46

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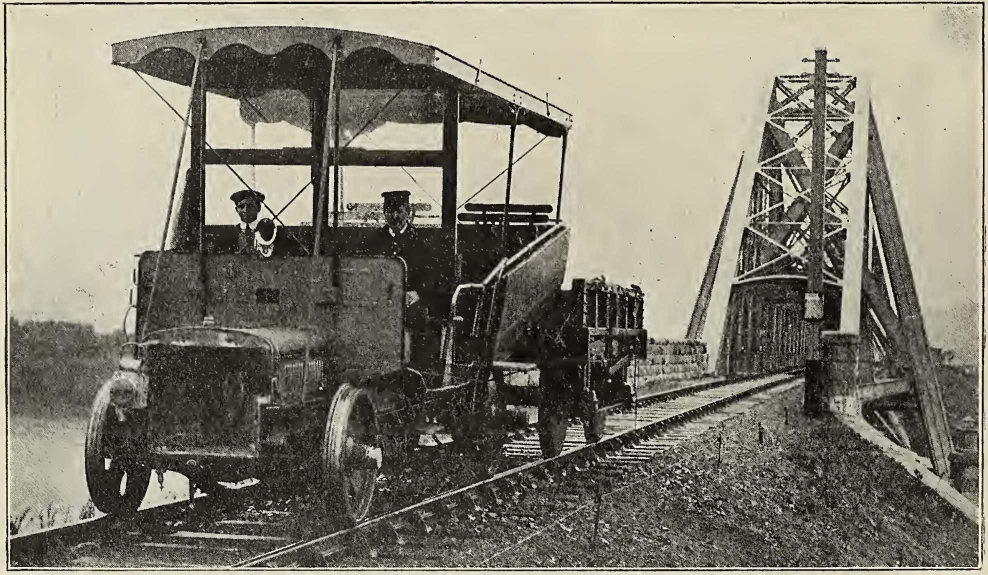
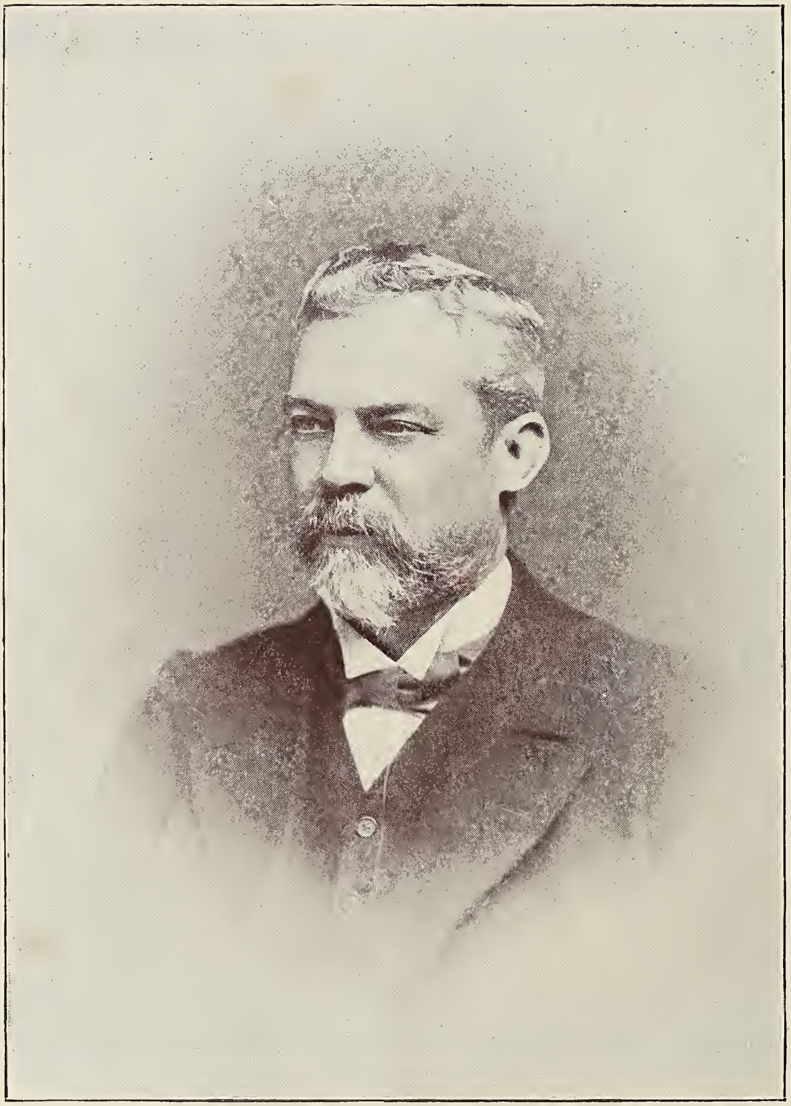
* Decrease in number, but increase in carrying capacity.



PETROL RAIL MOTOR *char-a-banc*, WITH CARRIAGE TRUCK FOR MOTOR CARS, EMERGING FROM THE 'FORTH BRIDGE'S GREATEST BRITISH RIVAL' AT CONNEL FERRY.



Yours faithfully,
James Thomson.

THE RAILWAY MAGAZINE

OCTOBER, 1897

ILLUSTRATED INTERVIEWS

No. 4.—Sir James Thompson

General Manager, Caledonian Railway

"THE readers of the Railway Magazine will be greatly interested to have some details of the Caledonian Railway, Sir James, as, since the 'race' of 1895, when the 'Caley' engines did some remarkably fine work, the public have taken a great interest in the line you so ably manage."

"I shall be pleased to be of service to you and the public; but I would be disappointed if the interest in my Company were limited to the incident you refer to."

"In this remarkable year of jubilees, I believe the jubilee of the Caledonian Railway occurs? Some particulars of its early history will, therefore, be of peculiar interest."

"Well, probably the most exciting period of its history was before it existed."

"Before it existed, Sir James?"

"Yes; it had a severe struggle for existence, to begin with. In the early 'forties,' when the idea of a railway between Scotland and England took form, the universal opinion of Parliament and the public was that only one line between the two countries could possibly pay, and a great contention arose between the partisans of the Annandale and Nithsdale routes. The Annandale was the shorter to both Glasgow and Edinburgh, but it had a difficult ascent up Beattock Summit, while the Nithsdale was the longer route, but had the advantage of easy gradients. For years a controversy, almost theological in intensity, went on between the promoters of the two routes. Eminent engineers were appointed to settle the question, and, of course, disagreed; a Royal Commission was sent to Scotland to examine the question and advise Parliament; and perhaps the most prolonged and exciting contest in the history of railway legislation took place in the Parliamentary Committees. The Caledonian promoters, however, got their Bill in 1845, at a cost of £70,000 in Parliamentary expenses, authorising the construction of the first through railway between Scotland and England. Now that there are four lines of railway connecting the two countries, all well occupied with traffic, it may raise a smile to look back on the excitement of the early promoters; but the position the public and Parliament took up was natural and pardonable: they could not calculate on one unforeseen circumstance."

"What was that, Sir James?"

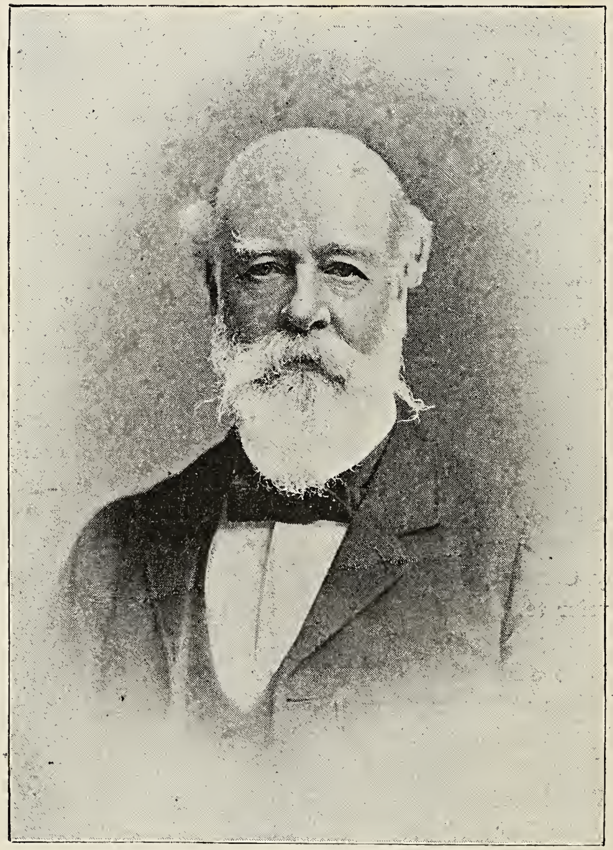
"Simply that the railways they were promoting were destined to become the chief instruments in developing the industrial resources of the country."

"It must be admitted we are apt to forget that fact. When was the Caledonian line opened, Sir James?"

"The line was opened from Carlisle to Beattock on September 10th, 1847; to Edinburgh and Glasgow on February 15th, 1848; and to Castlecary, or Greenhill, where it joined the old Scottish Central, then in course of construction, on August 7th, 1848.”

“Can you inform me the original length of the line, and what the present mileage is?”

“Oh, yes. The original mileage of the Company was 122 miles 19 chains, or, if you include the previously existing Glasgow and Garnkirk Railway and the Wishaw and Coltness mineral line, which it absorbed in its progress towards Glasgow, 144 miles. The Company now own 776 miles of line, partly own 152¼, and our engines work over a total length of 1,115½ miles of railway.”



CHAIRMAN, CALEDONIAN RAILWAY

“How has this large increase been attained, Sir James?”

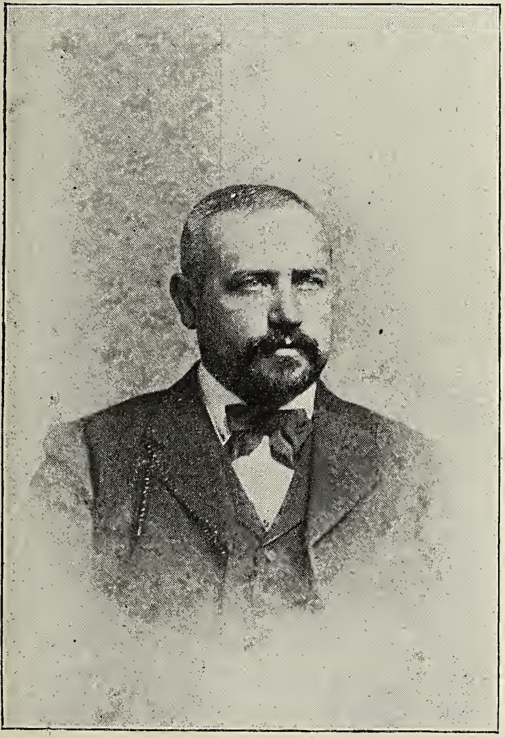
“By the double process of absorption and extension. As already stated, we absorbed two small lines to complete the route to Glasgow on the North; also at the beginning of the Company's career, the Clydesdale Junction line from Motherwell to the South Side of Glasgow was purchased; shortly thereafter the Greenock line was bought up, and these early transactions established the Company on both sides of the Clyde at Glasgow, and are the secret of the predominating position we have always held in this city. In 1865 and 1866 we amalgamated the Scottish Central lines and the group of lines forming the Scottish North-Eastern Railway, and since that time the Caledonian Railway has extended longitudinally from Carlisle to Dundee and Aberdeen, and latitudinally from Edinburgh and Leith to Glasgow and Greenock. It would be tiresome to you and to your readers to detail all the amalgamations which have taken place, but I may say that we have from time to time absorbed thirty-five lines of railway. Mr. George Graham, our Chief Engineer (who, by the way, started the first engine from Carlisle to Beattock, and who is celebrating *his* jubilee of service with the Company this week), is at present occupied in bringing together in chronological order the records of the various lines.”

“And the extensions of your system? Have they been local or general, Sir James?”

“Very general. All over the country we have been forced—but, I must say, willingly forced (although it sounds contradictory)—by the indomitable industrial energy of the people of Scotland, into making new and branch lines. The development of the Lanarkshire mineral fields has occupied a deal of our attention; the steel industry in Lanarkshire, the casting trade in Stirlingshire, and the suburban expansion of Glasgow, Edinburgh, Dundee, and other towns, have all claimed our attention and made inroads on our capital; but it goes without saying that Glasgow and the Valley of the Clyde have made the greatest, and most deserved, demands on our energy."

"What have been your most recent and important enterprises?"

"Without hesitation, I answer, the Glasgow Central and Lanarkshire and Dumbartonshire Railways, which were gradually opened in 1895 and 1896. I have already referred to the commanding position the Caledonian Company has held in this great industrial centre, and our grip of Glasgow business has certainly been strong; but we had one weak point: we had no independent access to the north-western district of the city, and it was evident to me, and to everyone, that the city was rapidly expanding westward—for residential purposes, guided by some law I could never understand, and for industrial purposes, drawn by the vacant ground along the northern bank of the river. I could not contemplate the prospect of practically a new city rising between Glasgow and Dumbarton without desiring to link up the Caledonian system



Yours very truly
W. Patrick

ASSISTANT GENERAL MANAGER, CALEDONIAN RAILWAY

Yrs faithfully
W. M. Hillhouse

GENERAL GOODS MANAGER, CALEDONIAN RAILWAY east and west. A direct Caledonian connection with the west was certainly wanted for the present; for the future it was absolutely imperative, and these considerations were the genesis of the project. The Glasgow Central Railway now traverses the city from east to west for six and a half miles under the main thoroughfares, and it cost over £2,000,000—a large sum, certainly, but the Company is firmly established in the north-western district of Glasgow, and, as regards the future, my mind is at ease. The Lanarkshire and Dumbartonshire Railway brings us at once into direct contact with the shipbuilding and engineering works on the north bank of the Clyde reaching to Dumbarton; through the Dumbarton and Balloch Joint line the Caledonian Company have now direct access to the extensive Turkey-Red Dye Works in the Vale of Leven, and to Loch Lomond, and we desire to cultivate to the utmost the tourist and excursion traffic to the 'Queen of Scottish Lakes.' With particular reference to the future, we are now prepared for any development in the West that may occur."

"How long have you had control of the Company, Sir James?"

"I became General Manager in 1882."

"Will you favour me with some statistics showing the progress of the Company?"

"With pleasure. I have here a statement which I have had prepared. In the comparison, I have taken the year 1848, the Company's first complete financial year; 1882, the year of my succession to the management; and the present year, based on the last two half-yearly reports of the Company."

	1848.	1882.	1897.
Miles of Railway worked by Engines	159	917	1,115
Capital Expended	£4,865,000	£38,100,000	£48,700,000
Staff	1,600	13,600	over 20,000
Engines	96	689	764
Goods Wagons	1,089	12,078	15,302
Mineral do.	2,825	30,740	42,623
Passenger Vehicles	226	1,578	2,040
Number of Passengers	389,138	15,390,249	38,000,000
Coaching Revenue	£113,899	£907,376	£1,400,000
Goods Tonnage	492,129	2,964,266	4,000,000
Mineral do.	1,853,666	11,310,769	16,500,000
Goods and Min. Revenue	£95,300	£1,749,657	£2,200,000
Working Expenses	£96,213	£1,300.684	£1,700,000

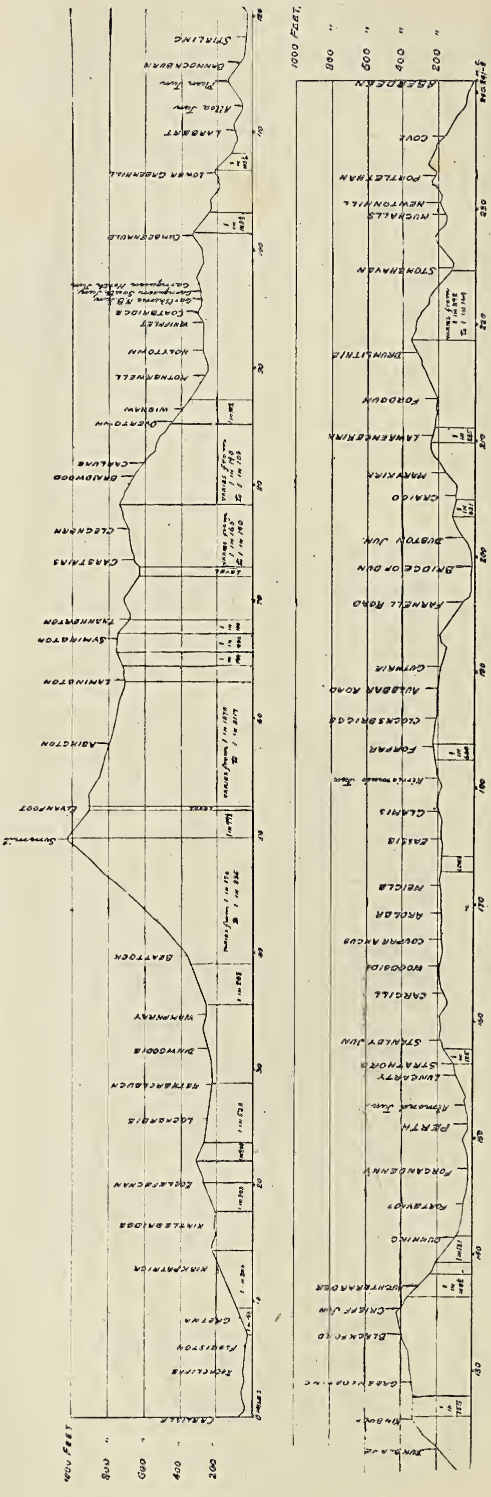
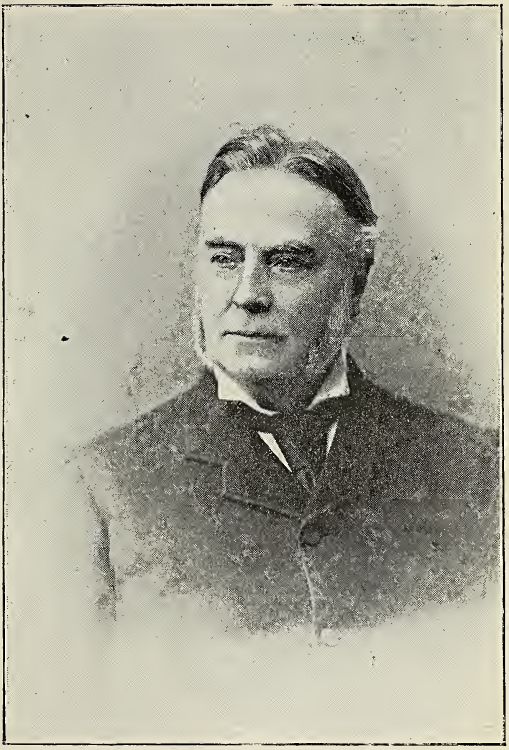


DIAGRAM SHOWING GRADIENTS BETWEEN CARLISLE AND ABERDEEN, CALEDONIAN RAILWAY



Yours faithfully
Irvine Kempt

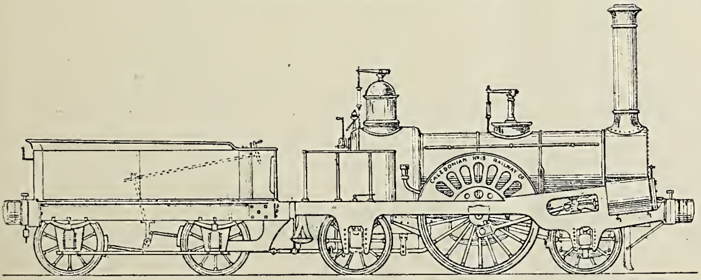
GENERAL SUPERINTENDENT, CALEDONIAN RAILWAY

"It is remarked that the Caledonian Company is more closely identified with Glasgow than with Edinburgh. How is that?"

"To some extent that is true, but the fault is not the Caledonian Company's. The configuration of Edinburgh does not easily adapt itself to railway enterprise, and, when we went there in 1848, the only natural avenue for a railway was occupied by the Edinburgh and Glasgow line, and the Caledonian had to be content with a position at the west end of Princes Street, at that time on the outskirts of the city. We have not been neglectful of Edinburgh; we have constructed suburban lines to Leith, Granton, Balerno, and Barnton, and we have inaugurated excellent train services to and from England, the North, and Glasgow. The natural trend of the population westward is every year improving our position in Edinburgh, and we are about to erect an hotel at Princes Street Station which will be a credit to the city, one of whose charms is its architecture."

"Thank you, Sir James. The importance of the Caledonian as forming a considerable portion of the West Coast route is well known. How long have the intimate relations between your Company and the London and North-Western Company subsisted?"

"The close relations between the two Companies were really anticipated by the original promoters of the Caledonian line, who acted in concert with the Grand Junction and Manchester and Liverpool Companies from the beginning. The basis of all the negotiations between the English railway directors and the Scotch promoters was the completion of a mutually advantageous through route between England and Scotland, by the promotion of a line from Preston to Carlisle on the one side of the Border, and of the Caledonian line on the other side; and it was natural that the business relations between the railways now forming the main line of the London and North-Western Company and the Caledonian should be intimate from the start; they ran into each other. For many years now the two Companies, in the exchange of traffic between the



ORIGINAL LOCOMOTIVE FOR THE CALEDONIAN RAILWAY, Built 1847 two countries, have worked in close concert, and I believe this has been to the advantage of the public."

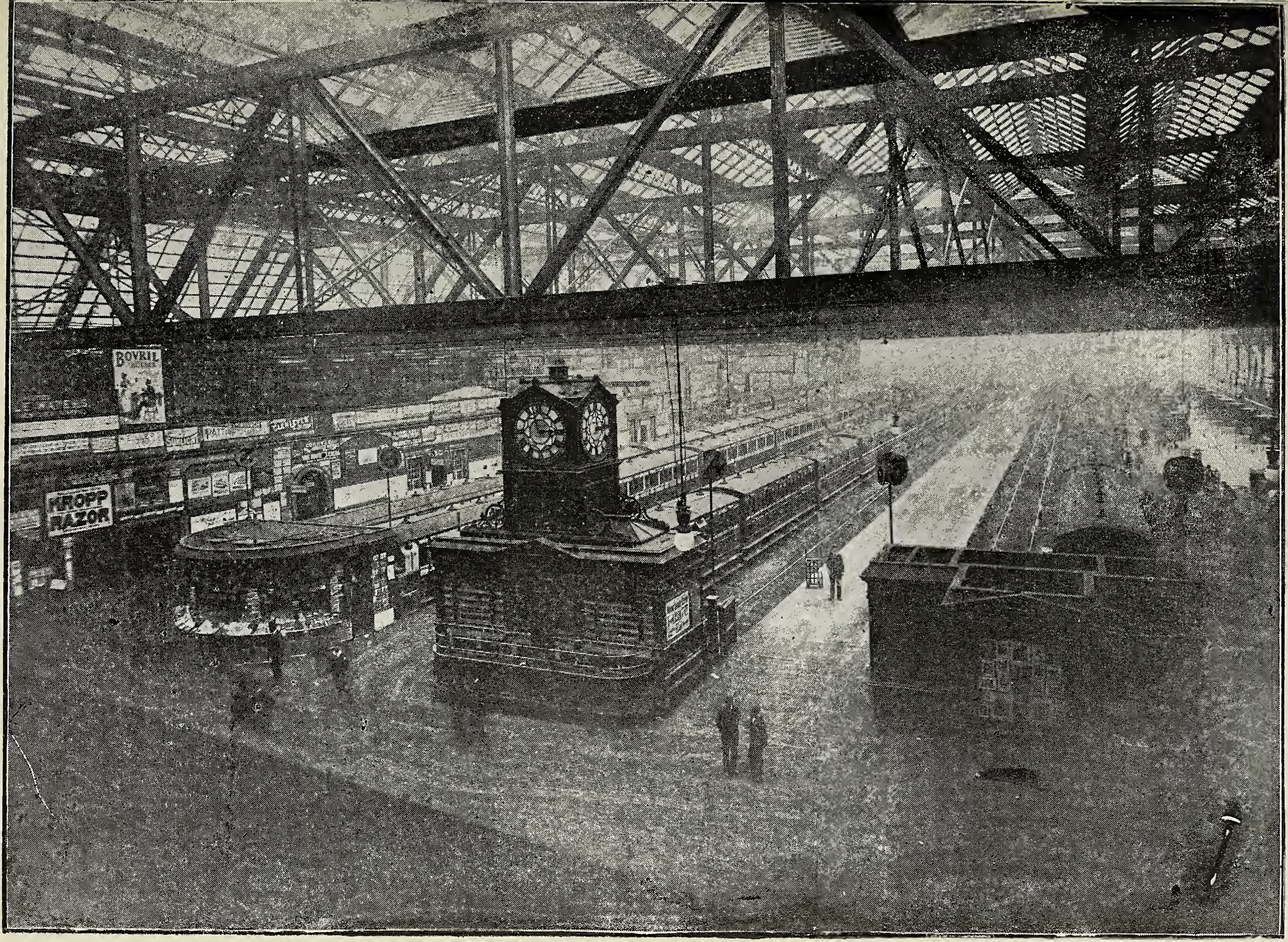
"From the point of view of a railway manager, what do you consider public advantages, Sir James?"

"Well, it is surely a public advantage to be conveyed from Inverness, Aberdeen, Edinburgh, or Glasgow, to London, or Birmingham, or Manchester, or Liverpool, without change of carriages—without, in fact, being aware when you leave one railway and go on to another. And then, without absolute conformity of rolling stock, the public could not have possessed all the modern comforts when travelling on long distances which we and the London and North-Western Company have introduced."

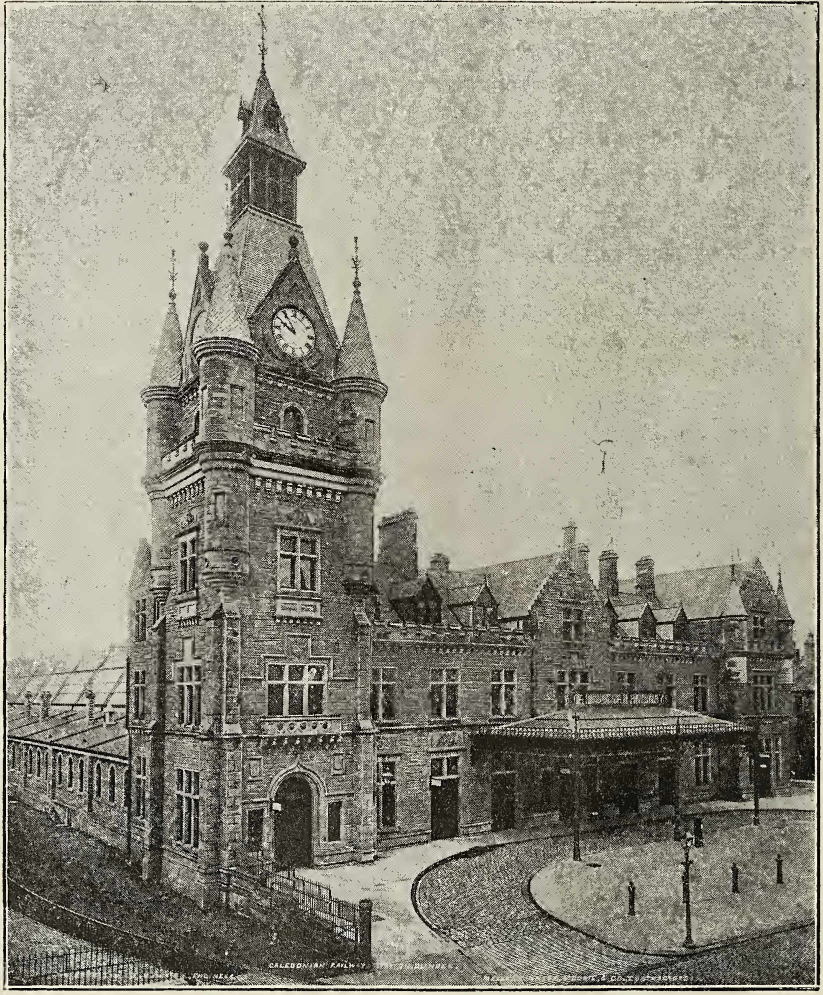
"What are the comforts that are in your mind?"

CENTRAL STATION AND HOTEL, GLASGOW

"Generally speaking, the ease attendant on well-built, cushioned, heated, and lighted carriages, both first and third class, has been secured by the joint stock arrangement. Then the dining-cars, which were initiated by the West Coast route to first-class passengers in July, 1891, and to the third-class two years afterwards; the corridor system, which was first

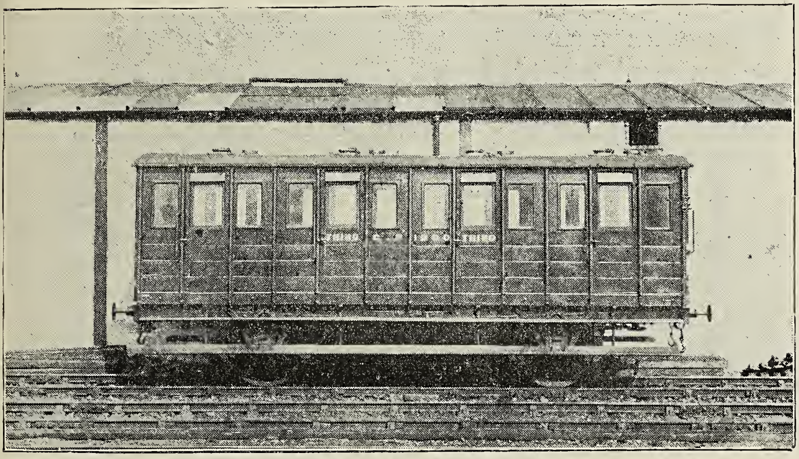


INTERIOR OF CENTRAL STATION, GLASGOW, CALEDONIAN RAILWAY introduced to this country by the West Coast Companies in July, 1893, and which, by the way, was arranged at my last interview with the late Sir George Findlay. Then in the conveyance of goods, the two Companies have given a great impetus to trade between the two countries, which could not have been accomplished without their active co-operation. For instance, in 1885, the West Coast route instituted a midday service for goods between Glasgow and Edinburgh on the one hand, and London, Birmingham, etc., on the other hand, by which goods leaving the Scotch cities are delivered in the English cities on the next morning after despatch, and *vice versâ*. And again, in 1890, we inaugurated our 2 p.m. fish train from Aberdeen to London, by which fish caught off the north-eastern coast of Scotland one morning are passed through the markets and served at breakfast in London (a distance of 540 miles) on the following morning, and in this way a double benefit has been conferred: a great fishing industry has been fostered in the North, and an unlimited supply of cheap food has been opened up to the dense populations of London and other English cities."



THE NEW DUNDEE STATION, CALEDONIAN RAILWAY

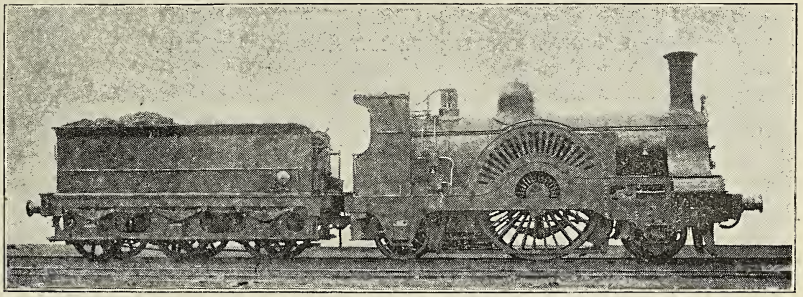
"Am I right in assuming that the West Coast traffic is your Company's most valuable traffic, Sir James?"



CALEDONIAN RAILWAY—THIRD-CLASS CARRIAGE, Built 1857

"By no means. We place a high value on the West Coast through connection with England; we have spent a great deal of money, and are prepared to do everything necessary, to maintain and increase the popularity of the West Coast route; but the backbone of our revenue is within our own borders. I should pity the railway company that was dependent on extraneous traffic for its success. Highly as we appreciate our relationships with the North-Western and other companies, which are harmonious and mutually advantageous, our own Caledonian local traffic occupies our special attention. As you will observe from the statistics I handed you, we have an immense trade, of which the English portion, valuable as it is, is not anything equal to our local revenue."

"Have you been doing anything specially to develop, say, your local passenger traffic?"

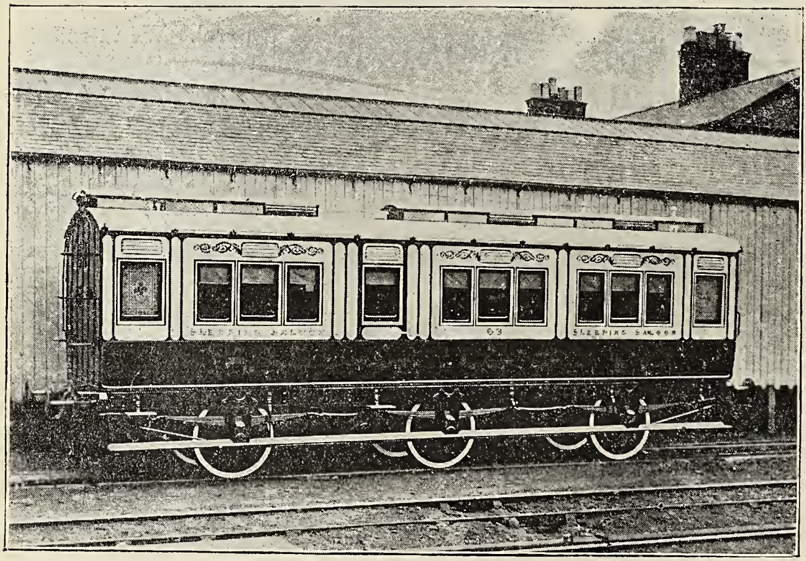


CALEDONIAN RAILWAY—CONNOR'S 8FT. 2IN. "SINGLE" LOCOMOTIVE, Built 1859

"Oh, yes. We have perfected our local traffic as much as possible. Every improvement in connection with the long distance traffic with England has been introduced into the principal local services, except the dining-cars and corridor system. We were the first railway in the kingdom to introduce the system of booking third-class passengers by all trains between stations over which we had entire control. We introduced the principle of 'return fares at single fare and quarter,' and this has been in operation between Glasgow and the North, and at some other places, since 1872. In 1861 we introduced, for the first time in railway experience, the circular tour system, which has now become universal; and we are now giving 'week-end' facilities—i.e., we book passengers from and to any part of our own line from Friday or Saturday till Monday at a single fare for the double journey. I think I am justified in describing these practices as 'boons' to the public; and it is particularly pleasing to me to see the 'week-end' fares so greatly appreciated, especially by the working classes and others in our populous towns, to whom a breath of the country air once a week must be beneficial."

"I understand you have a large seaside traffic?"

"We have an extensive 'coast' traffic, as we call it in the West of Scotland. In 1889, we opened an important extension from Greenock to Gourock, where we built a commodious pier, and from which there are several steamers sailing daily all the year round to Dunoon, Rothesay, etc. In 1890, the Lanarkshire and Ayrshire line, which was constructed under the Caledonian Company's auspices, was opened to Ardrossan, from whence the 'Duchess of Hamilton,' one of the finest river steamers afloat, sails to and from the Island of Arran. In 1893 we amalgamated with the Wemyss Bay Railway and Pier, and from this pier we have steamboat connections to Rothesay, Largs, and Millport. The Caledonian Steam Packet Company possess a fleet of ten fine steamers, sailing in connection with our trains from these three ports, and they carry enormous crowds during the holiday season. Besides these steamers, we run in direct connection at Gourock with Mr. McBrayne's steamers 'Columba,' 'Iona,' etc., to the West Highlands; the 'Lord of the Isles,' to Inveraray; and the 'Davaar' to Campbeltown, etc.; and at Ardrossan, with Messrs. G. and J. Burns' Summer Daylight Service to Belfast. Speaking generally, we run trains in direct connection with all the lines of steamers to the West Highlands, Ireland, Isle of Man, Bristol Channel, and the South of England."



ORIGINAL W.C.J.S. SLEEPING SALOON, Built 1874

"I understand you build your own engines, Sir James?"

"Yes; we have done so to some extent for many years, but since about 1885 we have been our own builders exclusively."

"Have you anything to say about the various types of engines your Company have produced?"

"Very little indeed. The fact is, as soon as one type is superseded by a better, it is forgotten. We have had to change our types repeatedly—sometimes experimentally; but generally our efforts have been governed by changes in the conditions of railway business. As our loads have increased, our engines have been increased in strength, and with the demand for quicker journeys we have had to study both strength and speed. We introduced the 'Dunalastair' type of engines last year, combining both of these features. It has been better described by specialists than I may venture to do; but I may say in brief that its distinguishing features are a large heating surface, and especially great water-carrying capacity, which enables it, when necessary, to travel long distances without stopping for water supply. It runs daily with the down tourist train from Carlisle to Stirling, a distance of 118 miles in 123 minutes without a stop, and on the journey it has to surmount the abrupt Beattock Bank with a rise of 650 feet within 10 miles. But, effective as it is, we are already improving on it, and it will undoubtedly be superseded by our next type of engines now being erected."

"I feel, Sir James, I am occupying a good deal of your valuable time, but I would like to know if you have any works in progress at present?"

"We have in the near future an extension of the Lanarkshire and Ayrshire line of about twenty-three miles in length; an extension of the Callander and Oban line from Connel Ferry to Ballachulish, about thirty miles; a new line from Glasgow to Renfrew, some six miles; and the new Paisley and Barrhead Railway, some ten miles. Although these are not 'Caledonian proper' lines, they have been carried out under this Company's wing, and we shall be financially concerned in them. Then we are arranging for the construction of thirty-five miles of railway from Lesmahagow to Stonehouse, Strathaven, and Darvel, and from Glenbuck to Muirkirk, to improve the transit of the Lanarkshire coal to the Ayrshire ports."

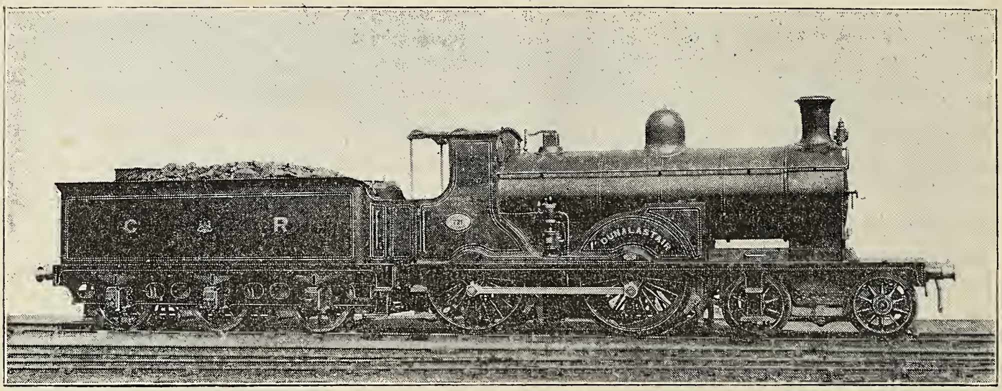
"By the bye, Sir James, speaking of ports, is your Company interested in any as proprietors?"

"Yes. In 1867 we took over the Forth and Clyde and Monkland Canals, with fifty-two miles of waterway, and the purchase included the port and docks at Grangemouth, on the Firth of Forth. The traffic developed under our care so rapidly that in 1882 we added a new dock, and the traffic has again outstripped the accommodation. This year we got authority to construct an additional dock of thirty acres, more than doubling the present dock area, with a straight channel to the Firth, to avoid the crooked, shallow river Carron, which is our present access. The work will be costly, and will be proceeded with immediately."

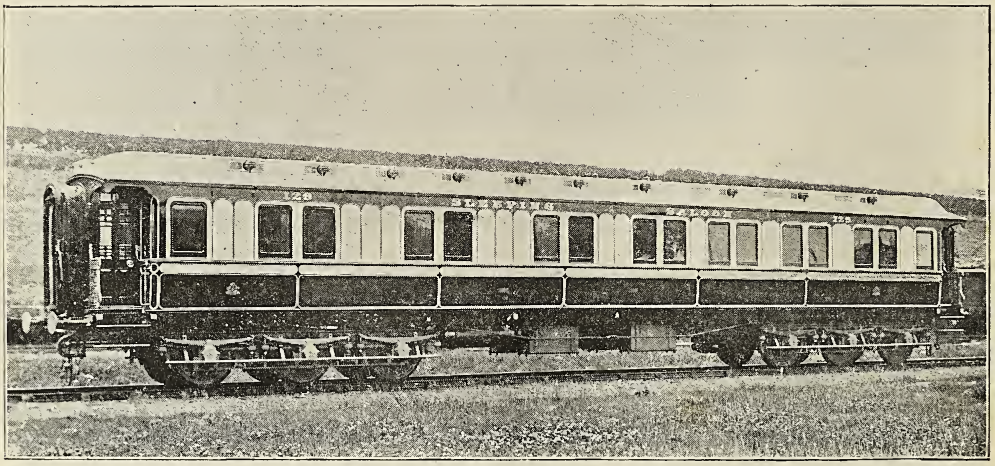
THE NEW PRINCES STREET STATION, EDINBURGH

"It is strange to us in the South, Sir James, that your financial half-years should end on 31st January and 31st July, a month later than the English companies. Can you account for this?"

"I admit there is a mystery about what you refer to. The change took place in 1851, by a resolution of the Board of Directors; but there is nothing in our records to indicate a reason for the change. The Caledonian Railway Arrangements Act, 1851, provides for the half-yearly meetings of the shareholders being held in March and September of each year, which is a very late date; and it has occurred to me that the Directors may have considered the intervals between the closing of the accounts at the end of December and June and the shareholders' meetings in March and September inconveniently long, and on that account put back the financial half-year by a month. However that may be, it is a very convenient arrangement; it equalises the revenue of the two half-years. The passenger traffic for the months of July, August, and September is a large item in our accounts, and if all three months were included in the same half-year, it would disturb the financial equilibrium, and that would be inconvenient."



THE FAMOUS CALEDONIAN RAILWAY LOCOMOTIVE "DUNALASTAIR"
Built at St. Rollox Works, 1896. Tractive force, 14,400lb.



1897 "TYPE" OF W.C.J.S. CORRIDOR SLEEPING SALOON

"Have you any remarks to make on the Workmen's Compensation Act, or as to the differences that occasionally rise between the management of a railway and the employees?"

"Perhaps it is rather early to express any definite opinion on the new principle introduced into Scots Law by the recent Compensation Act. As regards the differences with the employees, we are fortunate in having very few disputes at the present time, and those that do exist I hope will be amicably settled by free intercourse and mutual considerateness. It is our policy to deal promptly with cases of hardship in the terms of service as these come under the notice of the officers, or are brought under my notice by the men themselves.

During the last five years we have voluntarily reduced the hours in several of the grades of our servants. I am proud of our staff, and my interviews with them have always been free and amicable, whether I was able to grant their requests or not. I have always admired the ability and persistence of the men's representatives—appointed by their fellow-workmen—in presenting their case, and when assent on my part was out of the question, probably I was the more disappointed party of the two."

"I must ask you to pardon me again, Sir James, but would you be good enough to give me some details of your career in the Company's service?"

"Oh, that is soon told. I entered the Company's service as a lad in 1848, and rose step by step through all the stages of railway life. In 1856 I was appointed chief clerk in the Goods Manager's office in Glasgow; in 1865 I became a district officer in Edinburgh, but only remained there a very short time, returning to Glasgow in January, 1866, when I was appointed District Goods Manager for the Western and Southern Districts, which position I held till 1870, when I became General Goods Manager; and in 1882 I was appointed General Manager. I am proud to say that every officer of the Company has risen from the ranks by their own hard work."

CALEDONIAN RAILWAY—THIRD-CLASS CARRIAGE, Built 1897

"Her Majesty recently conferred on you the honour of knighthood, Sir James, and I congratulate you, apologising for not having done so earlier in our conversation."

"I thank you, sir. I don't deny I appreciate the honour Her Majesty has conferred on me, but I am not so foolish as to attribute the distinction to personal considerations. It was conferred on the General Manager of the Caledonian Railway; it was in that sense I accepted it; it is in that sense I cherish it."

G. A. Sekon.

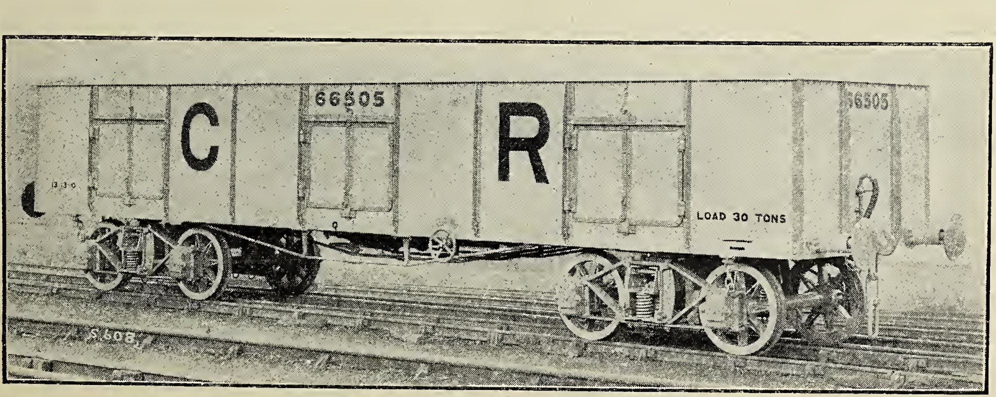


FIG. 6. 30-TON ALL-STEEL BOGIE COAL WAGON: CALEDONIAN RAILWAY.

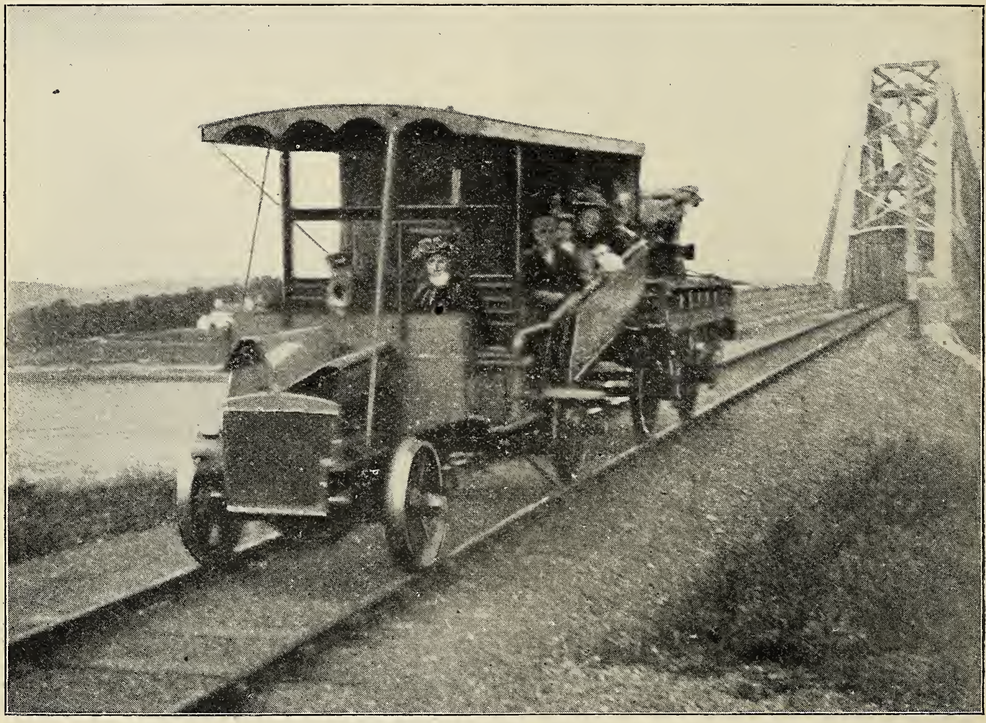
Sept. 1909

Novel Traffic on the Caledonian Railway.

IN the article on *Summer Train Services* in the July issue of the RAILWAY MAGAZINE, attention was called to the inauguration by the Caledonian Railway of a motor car service for passengers and road motor cars across Loch Elive, at Connel Ferry, by means of the railway over the 'Forth Bridge's greatest British rival.' By the courtesy of Mr. T. W. Pettigrew, the General Superintendent of the Caledonian Railway, we are now enabled to illustrate the rail-motor and trailer by means of which this useful and novel service is performed.

The Caledonian Railway purchased an ordinary road motor car, and under the superintendence of Mr. J. F. McIntosh, this was converted, at St Rollox Works, into the rail motor car, as illustrated.

The car performs, daily, several journeys from Connel Ferry across the bridge to North Connel, and four of these trips in each direction are extended an additional 2¼ miles beyond North Connel to Benderloch, and it is on these longer journeys that road motor cars are conveyed on the carriage truck provided for the purpose, which is attached as a trailer to the rail-motor car. The journey from Connel Ferry to North Connel occupies 5 min. and an additional 10 min. is spent on the trip to Benderloch.



HELPING A COMPETITOR!

The Caledonian Railway's rail-motor car, with carriage truck attached—on which is a road motor car—emerging from the Connel Ferry Bridge.

Sunday trains are few and far between in Scotland, and it will therefore surprise readers of the RAILWAY MAGAZINE to learn that an exception (to prove the rule) has been made in the rail-motor service between Connel Ferry and Benderloch, the car travelling 5 times in each direction on the Sabbath; which shows that Scotsmen (or is it the Southern visitors?) motor more frequently on the first day of the week than on the other days.

There can be no doubt that motorists appreciate the assistance the Caledonian Railway is affording them by means of this service, to enjoy their favourite pastime.

In the past, this portion of Argyllshire has been somewhat of a closed district to motorists, owing to the long arms of the sea which intersect the land and the numerous ferries that have in consequence to be crossed. Access to the very charming district that lies between Loch Etive and Lochleven, has been particularly difficult, as the ferries have become unserviceable since the opening of the Ballachulish Railway, whilst the comparative infrequency of the trains upon the Ballachulish line, and the restrictions on the conveyance of motor cars by the ordinary trains made crossing at Connel Ferry both inconvenient and unreliable, the illustration 'At Owner's Risk' on page 189 of the RAILWAY MAGAZINE for September, 1907, bearing striking testimony to the fact. Motorists had therefore, perforce, either to avoid the district or to proceed round by Tyndrum and Glencoe, involving a very long detour.

The motor cars (as our illustration shows) are loaded on a carriage truck which is attached to the rail-motor. This rail-motor makes regular runs from Connel Ferry station to Benderloch on week days at 8.25 a.m., 1.0 p.m., 2.30 p.m., and 6.20 p.m.; and on Sundays at 10.30 a.m., 1.0 p.m., 3 p.m., 5 p.m., and 7.30 p.m.; from Benderloch to Connel Ferry on week days at 9.20 a.m., 1.45 p.m., 3 p.m., and 6.50 p.m., and on Sundays at 11 a.m., 1.20 p.m., 3.20 p.m., 5.20 p.m., and 8 p.m. Special runs may be arranged between these hours if required. The charge for conveying motors across Loch Etive by this service is 15s. Tourists approaching Loch Etive from the North or Ballachulish side should note that the station for loading the road motors is Benderloch, about three miles north of the bridge, and not North Connel at the entrance to the bridge, which is for passengers only.

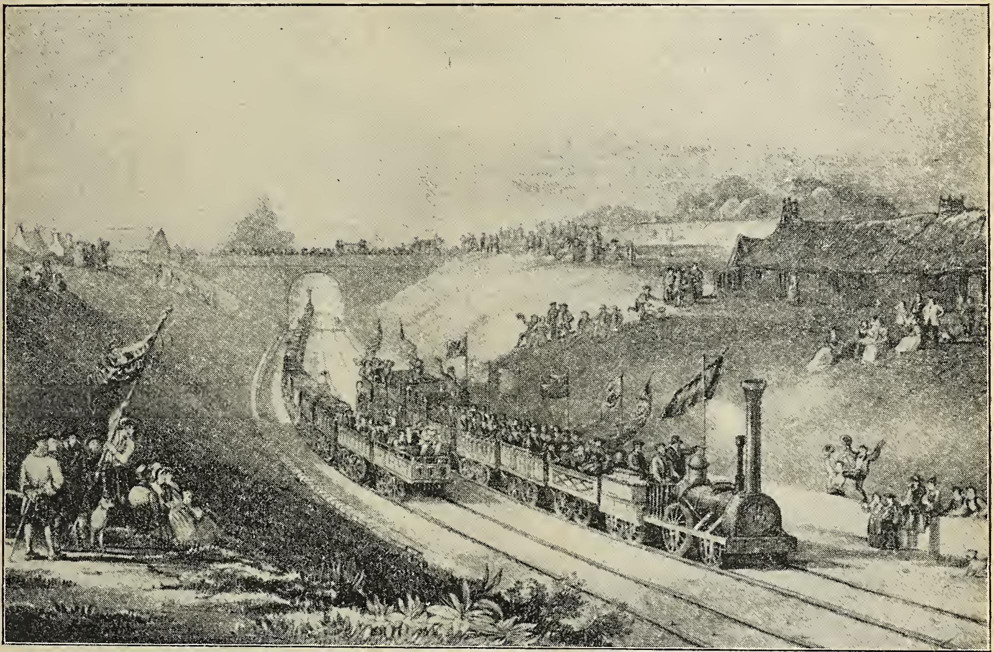
THE RAILWAY MAGAZINE.

JUNE, 1907.

The Genesis and Growth of the Caledonian Railway.

By R. W. Wilson.

IN the twentieth century it is a reproach to be "parochially minded." It is considered a discredit to a man if his mental vision is confined to the narrow environment of the parish, county, or municipality in which his lot is cast. Sixty years ago, however, prior to the exploitation of the country by railways, such an accusation could not have been made. The term of reproach indeed had not been coined, and it was the introduction of the rapid and cheap means of conveyance between distant and hitherto unvisited places by means of railways that gave birth to the term and imparted a sting to the reproach. Previous to railway travelling, the people, except the few whom fortune had favoured with the command of money, were necessarily possessed of parochial minds, because of their restricted knowledge of the world beyond twenty miles, or so, from their own doorsteps. Their simple wants were supplied by their neighbours, and their labour was confined to the limited needs of a narrow circle. Their commercial interests and investments were as circumscribed as their circumstances, and their ideas of the great world beyond their little world were unreal and fantastic as dreams. It was only on the intermittent occasions of a political upheaval, such as the Reform Bill agitation of 1832, or an ecclesiastical controversy, such as the Disruption of the Church of Scotland in 1843, that men's minds broke down the barrier of parochialism that invested them. Under these circumstances, it was the natural order of things that railway enterprise, in the days of its conception should be governed by the



PROCESSIONAL TRAINS AT THE OPENING OF THE GARNKIRK AND GLASGOW RAILWAY.

local necessities of restricted areas, and that the early, and, in the circumstances worthy, efforts at railway construction and extension were of the crudest description. The conception of a widespread, continuous, national railway system was an impossibility, and, with the limited knowledge of the times, would have been an anachronism. Modest as the Caledonian Railway at its origin may appear in these days when railways are measured by thousands of miles and fabulous capitals, it was at the period of its construction, although only 136 miles in length, and represented by a capital of some two millions of money, the most extensive railway enterprise attempted in Scotland, and one of the greatest engineering efforts of the Empire, and it was out of the long and bitter controversy which preceded its authorisation by Parliament that the idea of a national railway system emerged. One of the most frequent and effective arguments met with in letters and other documents originating with the Annandale Committee, hereafter referred to, was the superiority of the Beattock route " as a National or Scottish line, or, rather, the only one that can have pretensions to that designation," and its later development has amply fulfilled the conception of its early promoters. But before, and for years after its construction, the idea of a national system remained unrealised, and railway enterprise was dependent on local efforts, and intended to serve purely local purposes. The history of the important and national system known as the " Caledonian Railway " begins before it came into existence, and even before the name was thought of as applying to the great distributive agency into which it has developed.

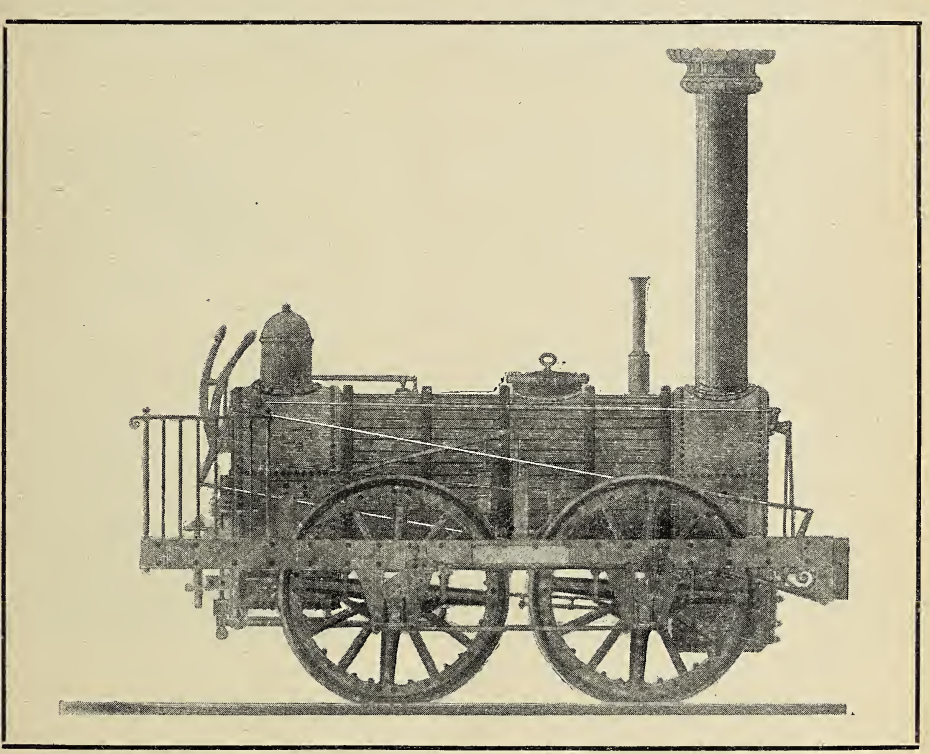
The earliest portion of what is now the Caledonian Railway system, originated, not inappropriately, in the City of Glasgow, with which it has since been so closely identified, and to the commercial prosperity of which it has largely contributed, by the construction of the Garnkirk and Glasgow, or, as it was latterly called, the Glasgow, Garnkirk, and Coatbridge Railway. It was authorised by Parliament in the Session of 1826, the year in which the Monkland and Kirkintilloch Railway—the first public passenger line in Scotland—was opened for traffic, and goods and passengers began to be conveyed over its short road in 1831. It started from Canal Street, Glasgow, on the north side of the Clyde river, behind the well known St. Rollox Chemical Works, on what was then the outskirts of the City, and terminated at Gartsherrie, where it formed a connection with the older Monkland line. The objects of the newer line were to bring coal and iron from the pits and works in the neighbourhood of Coatbridge to Glasgow, and to convey the rougher products of the City to the Monkland Railway, over which they could obtain more rapid transit to the Forth and Clyde Canal at Kirkintilloch than by the circuitous and tedious canal journey through the Port Dundas cut.

The other short local line, which, in after years, brought the Caledonian Railway into direct communication with Glasgow, was the Wishaw and Coltness Railway, opened between 1838 and 1842, from Morningside *viâ* Motherwell to Dundyvan Basin on the Monkland Canal, and, through the Monkland Railway, to the Forth and Clyde Canal, which was then the only means of access to distant markets. It was purely a mineral line, and so far as can be ascertained was never intended, and as a separate undertaking it was certainly never employed, for the conveyance of passengers. A junction was ultimately formed between this line and the Garnkirk and Glasgow Railway, and, when, in 1848, the younger and more enterprising Caledonian undertaking joined the Wishaw and Coltness line at Garriongill, south of Motherwell, the two local lines completed the first railway route between England and the West of Scotland. The only recognisable vestige of these two early attempts at railway construction now remaining is the venerable wooden bridge behind Motherwell. This bridge has for many years been replaced by one of more modern construction, a quarter of a mile or so to the west, but the piers and part of the wooden bridge work still stand, and serve to convey to the present day traveller some conception of the courageous, if crude, railway enterprise of our forefathers.

The benefits to the people of both countries of direct and continuous railway communication between Scotland and England began to be appreciated and seriously discussed on both sides of the border about the year 1833. One of the earliest and boldest schemes was to connect Newcastle-on-Tyne with Edinburgh and Glasgow *viâ* Otterburn, Jedburgh, and Galashiels to the capital, and *viâ* Peebles, Biggar and Lanark to the western City, which was then beginning to make rapid progress as a centre of commercial activity. Numerous meetings were held, and pamphlets published for a few years up to 1837 in the interest of this route, and, although the project failed, the discussion gave an impetus to local enterprise, and led to the promotion of the Glasgow, Paisley and Greenock, and Glasgow, Ayr and Kilmarnock Railways, the latter of which was destined to embarrass the efforts of the future promoters of the still unborn Caledonian Railway.

In 1836 Mr. Joseph Locke, engineer to the Grand Junction Railway of England, made a preliminary survey on behalf of his company as to the possibility of a continuous line from Preston *viâ* Lancaster and Carlisle to Edinburgh and Glasgow. So far as the route from Preston to Gretna was concerned he experienced no difficulty. To the north of Gretna he naturally took the Edinburgh coach route *viâ* Beattock, and at that point encountered the difficult ascent up the Elvan Water to Elvan Foot, which he considered so formidable that he retraced his steps to Gretna, and directed his attention to the Valley of the Nith, which presented an easier, though longer, course to Glasgow and the west, and in his preliminary report to his directors, he recommended the Nithsdale route. The first report on railway communication between the two countries, although admitted by Locke to be "limited and imperfect," played an important part in the long and distracting controversy which afterwards raged between the partisans of the Annan and Nith routes, in the "Battle of the Dales."

A copy of Locke's report having fallen into the hands of Mr. J. J. Hope-Johnstone, then Member of Parliament for Dumfriesshire, that gentleman sent it to Mr. Charles Stewart, factor for the Annandale estates, and a happier choice could not been have made, because, with all due respect to the earnestness and activity of the other gentlemen who afterwards formed the Annandale Committee, Mr. Stewart espoused the interests of the Beattock route with the enthusiasm of a partisan, the energy of a business man, and the tact of a diplomat. Mr. Stewart first put himself immediately into communication with the Secretary of the Grand Junction Railway, and afterwards



'GEORGE STEPHENSON,' THE FIRST LOCOMOTIVE OF THE GARNKIRK AND GLASGOW (NOW CALEDONIAN) RAILWAY.
Cylinders, 11 ins. diameter; 16 in. Stroke; Coupled wheels, 4 ft. diameter; Weight, 8 tons. Heating surface of tubes, 319·17 square feet. Built by R. Stephenson & Co., 1831.

directly with Mr. Locke, and succeeded in inducing him to make another and more exhaustive survey. In his second report (September 21st, 1837), Mr. Locke, while recognising the "difficulty in attaining the summit of the Evan," admitted the practicability of the Annandale route. It is interesting to observe that Mr. Locke, in his report, does not confine himself to the difficulties attending the *ascent;* "in the *descent,*" he says, "there is more danger, and this is a question of importance." In these days of high steam power and perfect machinery, one is apt to concentrate attention on the difficulties the early promoters of railways had to contend with in the crude condition of the locomotive engineer, and it requires an effort to remind one of the not less marvellous development of effective brake-power and the embarrassment of the earlier engineers arising from the defective apparatus then in use.

The efforts of Mr. Stewart did not terminate with his communications with Mr. Locke and the Grand Junction Railway officials. Recognising the importance of a railway in developing the resources of the estates under his charge, he formed a Committee of Annandale proprietors. During 1836 and 1837 he inaugurated meetings under the auspices of this energetic body of gentlemen, and issued a manifesto in favour of the Annandale route, along with Mr. Locke's report. While this was being digested by the public, the committee were occupied in maturing their scheme. This, however, proved uphill work. The Glasgow merchants and manufacturers, to whom they naturally looked for assistance, had taken up in an active manner the line from Glasgow to Kilmarnock and Ayr, and, although the "Central route," as the Beattock route was then called, had its supporters in that city, they were few, and somewhat lukewarm, while the active sympathies of the more numerous and influential merchants naturally gravitated to the Nithsdale route *viâ* Kilmarnock, which would attract business to the railway in which their money was invested. In March, 1839, the discussion of the question by the partisans of the opposing routes led to the proposal of a survey of both by two engineers, one English and the other Scotch, and the Annandale Committee, confident of the superiority of their route as the shorter of the two to Glasgow by 20 miles, and to Edinburgh by 70 miles, and "implicitly trusting to the impartiality of the gentlemen of Glasgow," agreed to the suggestion. Mr. Locke and Mr. John Miller were appointed to make the joint survey. In due time they issued their reports, and, as is not uncommon at the present day in the case of opposing railway projects, the engineers honestly earned their fees by each preferring the route of his employers, Mr. Locke supporting the Annandale, and Mr. Miller the Nithsdale, route.

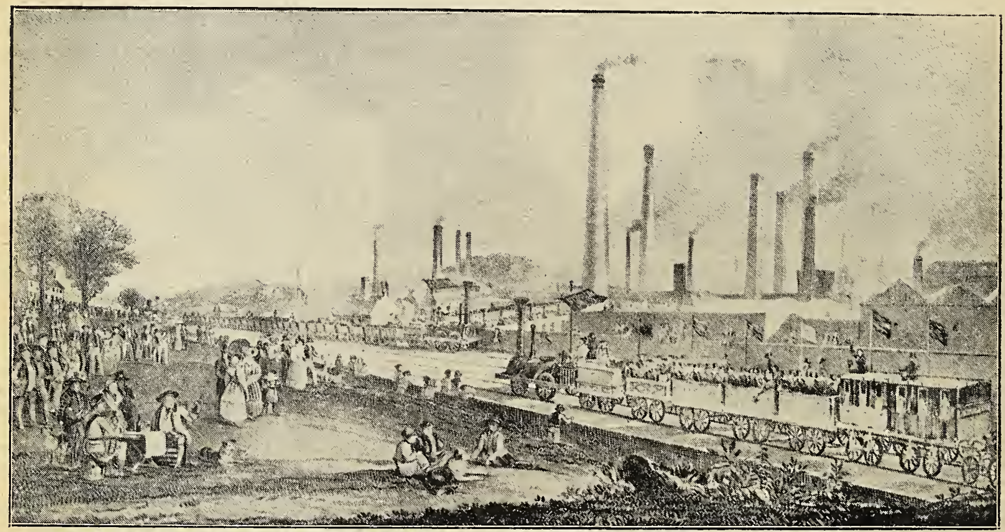
THE GLASGOW DEPÔT OF THE GARNKIRK AND GLASGOW RAILWAY.
From an engraving published in 1832.

In the meantime, the Government had appointed Sir Frederick Smith and Professor Barlow as Royal Commissioners to take evidence and report on the most advantageous through route from England to Edinburgh and Glasgow, and this unusual and important step increased and concentrated the activity of the Annandale Committee and the Glasgow supporters of the opposing route. Both parties laid statements and survey reports before the Commissioners, with the result that in March, 1841, these gentlemen issued an elaborate report, dealing fully and technically with the question of gradients, and finally deciding in favour of the route *viâ* Beattock, "provided security were given of a *bonâ fide* intention of completing the whole line from Lancaster." The satisfaction of the Dumfriesshire Committee, as may be conceived, was unbounded, and their energy quickened by this encouragement. The condition attached to this recommendation by the Commissioners forced them into closer relations with the Liverpool and Manchester Railway, the Grand Junction Railway and Lancaster and Preston Railway, whose interests clearly lay in completing the communication with Scotland in the direction indicated by the Commissioners, and they met the representatives of the English railways in July, 1841, and later, preparing for joint action and mutual support.

Hitherto the whole burden and responsibilities of the agitation had been borne by the Dumfriesshire gentlemen, the Lanarkshire proprietors having preserved a remarkable silence on this subject. Considering the obvious importance of the Annandale route to the Lanarkshire landowners, for the working and development of the stores of coal which were known to exist under the surface of their lands and the utter uselessness of the Nithsdale route to the Clydesdale district, it is remarkable that no movement had ever been made by them. The lukewarmness and even antipathy of the Glasgow merchants, whose financial interests lay in the other direction, can be understood and excused, but the apathy of the Lanarkshire proprietors, whose welfare was so much at stake, is one of those negative facts which defy explanation. It is not then surprising that Mr. Stewart should write to the Town Clerk of Lanark: "Now we think that you Lanarkshire people, landed-proprietors and burghers along the Vale of Clyde have shown a strange coolness and indifference in not supporting us in what is of great importance to you." At the latter end of 1841, the Annandale Committee directed their attention to Lanarkshire, and succeeded in bringing together a large representative meeting of the Clydesdale proprietors at Lanark on December 21st, at which a deputation from Dumfriesshire attended, with the result that the interest of the Clydesdale people was awakened, and they were brought into line with the Annandale Committee. A committee was also formed at this time in Edinburgh. There were at the same time indications of more generous support in Glasgow, the Chamber of Commerce having decided in favour of the Royal Commissioners' recommendation, and a committee of influential merchants and manufacturers was formed towards the end of 1841.

The next two years were occupied by the various committees, but chiefly by the Dumfriesshire gentlemen, who were unflagging in their activity in securing the public support, and cementing their relations with the promoters of the English railways, but a disturbance in the financial world occurred at this time, and hampered their efforts. Early in 1844, for the first time, the name of "Caledonian Railway" was used. Parliamentary Offices were taken at Westminster, a prospectus was issued, and preparations were made for promoting a Bill in Parliament. It was, however, soon apparent that the Nithsdale opposition would follow them there. The Ayrshire, Dumfries and Carlisle Railway publicly intimated in February, 1844, that it also intended to proceed with its Bill. This was succeeded in March by a letter from the Secretary of the Edinburgh and Glasgow Railway, urging its shareholders to encourage the western railway, and "discountenance the Caledonian." It would be tedious and unprofitable to dwell on the struggle in the Parliamentary Committee. The new railway was represented by seven counsel, headed by Mr. (afterwards Lord) Cockburn, the opposition by eight counsel, and eighty witnesses were examined. The House of Commons Committee were occupied from May 20th to June 3rd, and the Committee of the House of Lords from June 27th to July 5th, and finally the Caledonian Railway was authorised by Royal assent on July 31st, 1845. So ended one of the severest contests that has ever occurred in the annals of private Bill legislation, a contest which cost the young railway the enormous sum of £75,000.

Considering that there are now four Scottish through railway routes strained to their utmost to grapple with the volume of passenger and goods traffic between Scotland and England, it is almost comical to look back on the "pother" and contention that preceded the inauguration of the original through railway, but it must be remembered that the population of Scotland at the time was under 2¾ millions, that its industries were few in number and limited in extent, and that the unanimous opinion of railway promoters, Royal Commissioners, and Statesmen that only one railway between England and Scotland could possibly pay, was justified by the social and commercial conditions of the period. One factor in the future industrial development of the country was necessarily absent from their calculation, and that was the influence soon to be exercised by the distributive agencies they were promoting, in quickening the energies of the people, and bringing into action the hitherto undeveloped natural resources of the country. The popular ideas of the period were well expressed by the late Mr. Gladstone in a reminiscent speech delivered in the House of Commons on May 4th, 1888, on the subject of the proposed acquisition of the railways by the Government. On that occasion Mr. Gladstone said: "It is almost ludicrous to look back upon the infant state of the whole question (of railways) at that period, when compared with the enormous development it has now attained. . . . The unusual course was adopted by the Government of Sir Robert Peel of appointing a commission or a scientific agency to examine the whole question of what ought to be the line of railway into Scotland. . . . The motive was, that as it was known, or firmly believed, to be absolutely impossible that there should ever be more than one railway into Scotland, it was considered of the highest importance that the best scientific power of the country should be brought to bear on the choice of the line." As has been seen, the choice fell on the Caledonian Railway's route *viâ* Beattock. The extent of line authorised by Parliament under the Caledonian and Clydesdale Junction Railway Act of 1845 was :—

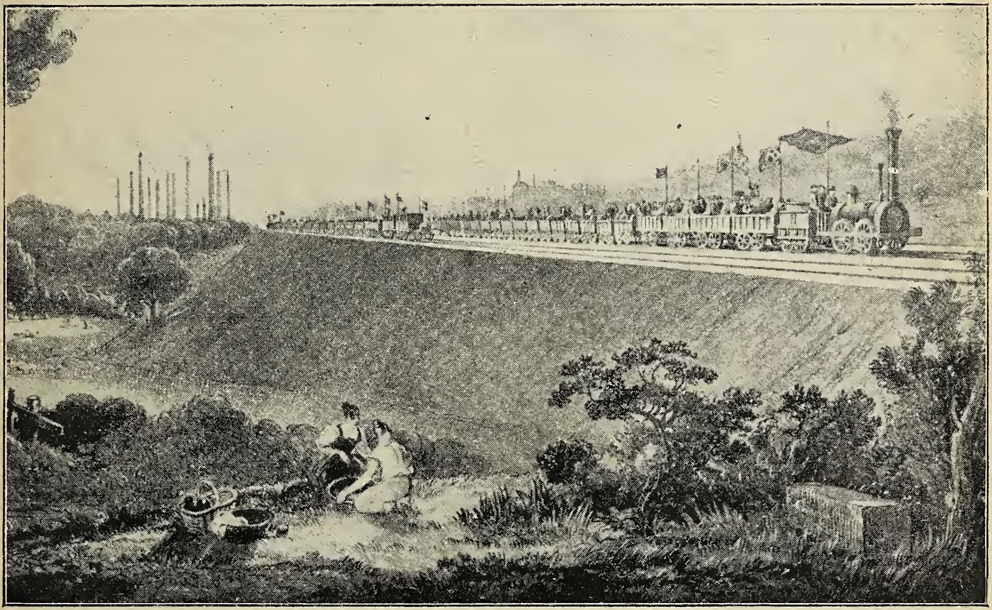


ARRIVAL OF FIRST TRAINS AT ST. ROLLOX, GLASGOW, ON THE OPENING OF THE GARNKIRK AND GLASGOW RAILWAY.

	Miles.
Carlisle to Garriongill, near Motherwell	84¾
Branch from Cumbernauld (on the Monkland Railway) to Castlecary or Greenhill	10
Clydesdale Junction Railway, from Motherwell to Glasgow, Paisley and Greenock Railway	14½
	136¼

If the preliminary controversy over the line raged long and furious, its actual construction proceeded apace. The first sod was cut at Lockerbie on October 11th, 1845. and on August 20th of the following year, 10,500 men, and in August, 1847, 20,000 men, were employed in its construction.

This immense army of workmen of the roughest character, and most unbridled habits, drawn from all parts, not only of Scotland, but of England and Ireland, was more than doubled by the simultaneous construction of the Scottish Central and other railway undertakings. The condition of Scotland may, therefore, be imagined rather than described. A vivid glimpse of the state of the country is given by the graphic pen of Thomas Carlyle, who, in writing from Scotland on August 29th, 1846, to Mr. (afterwards Sir Charles) Gavan Duffy, his intimate friend during life, and the faithful defender of his character after his death, says: "The country is greatly in a state of *derangement*, the harvest, with its black potato fields, no great things, and all roads and lanes overrun with drunken *navvies;* for our great Caledonian Railway passes in this direction, and all the world here, as elsewhere, calculates on getting to heaven by steam! I have not in my travels seen anything uglier than that disorganic mass of labourers, sunk three-fold deeper in brutality by the three-fold wages they are getting. The Yorkshire and Lancashire men, I hear, are reckoned the worst; and, not without glad surprise, I find the Irish are the best in point of behaviour. The postmaster tells me several of the poor Irish do regularly apply to him for money drafts, and send their earnings home. The English, who eat twice as much beef, consume the residue in whisky, and do not trouble the postmaster." Scotland was, indeed, in those days of railway construction on a large scale, thoroughly demoralised in many of the rural districts, and the bad effects of the navvy invasion was felt for many years afterwards.



TRAINS ON THE GERMISTON EMBANKMENT AT THE OPENING OF THE GARNKIRK AND GLASGOW RAILWAY.

The line was opened from Carlisle to Beattock in September, 1847, with the inevitable, and considering the difficulties the project had overcome, pardonable accompaniment of luncheon and congratulatory speeches. To Edinburgh, Glasgow, and Castlecary, the necessary extensions were opened between February and August, 1848.

The local character of early railway enterprise cannot be better exemplified than by a retrospective glance at the process of amalgamation of the lines comprised and included in the system of the "Caledonian Railway." The Caledonian Railway began early in its history to absorb the smaller undertakings in the vicinity of Glasgow. Several of these were purchased or amalgamated previous to its own opening, such as the Garnkirk line on the north side of Glasgow, the Pollock and Govan on the south side of the city in 1846, and the Greenock section early in 1847. The Wishaw and Coltness Railway was vested in the Caledonian Railway in 1849, immediately after the main line to Glasgow was opened. But the great period of amalgamation was in the years 1865 and 1866, when the northern sections were absorbed. Previous to this, however, a subordinate process of absorption had been taking place. Under the new name of the "Scottish North-Eastern Railway," the following series of small local railways were amalgamated in 1856 in the North. The Arbroath and Forfar Railway, the Aberdeen Railway (Aberdeen to Montrose), Newtyle and Glamis Railway, Newtyle and Couper Angus Railway, and the Scottish Midland Railway. In its turn the Scottish North-Eastern Railway was absorbed in 1866 by the Caledonian Railway, which at the same time acquired the Perth and Methven Railway, the Alyth Railway, the Dundee and Forfar branch, and the Dundee and Arbroath Railway.

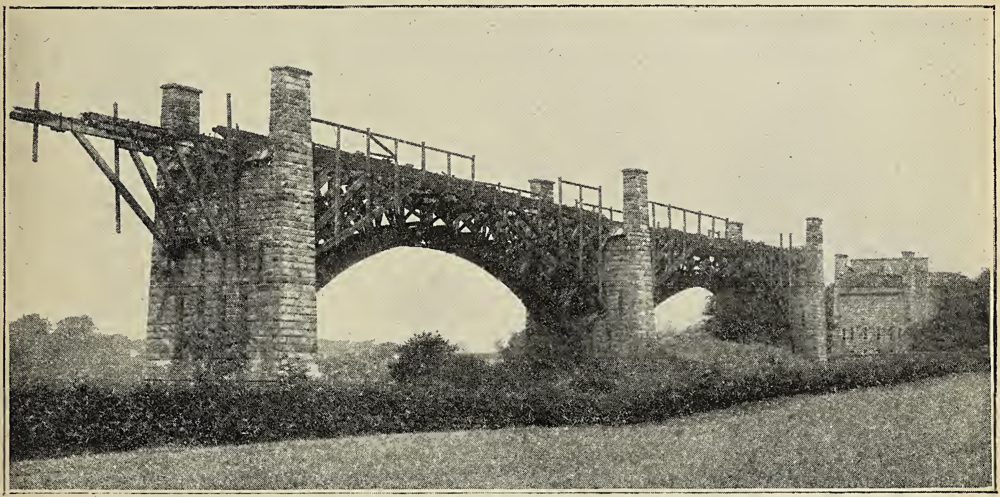
The "Central Section" was made up of the Dundee and Newtyle railway, the Dundee and Perth Railway, the Scottish Central Railway, the Crieff Junction Railway, and the Dumblane, Doune, and Callander Railway. These important railways passed into the hands of the Caledonian Railway in 1865. In the same year the General Terminus Railways on the south side of Glasgow, giving access to the River Clyde for the rapidly increasing Lanarkshire coal traffic, became vested in the stronger railway. Altogether, the Caledonian Railway amalgamated in these two remarkable years of its expansion, local lines with a mileage more than double its original undertaking. Two years afterwards (1867) the Forth and Clyde and Monkland Canals, 52 miles in length, with a short railway extending from Falkirk (Grahamston) to Grangemouth Dock were taken over by the Caledonian Railway, giving it a much needed access to the German Ocean for the development of the Lanarkshire coal traffic with the Continent of Europe. The years 1865, 1866 and 1867 stand out conspicuously in the history of the Caledonian Railway as its "great vesting period." From being itself a local line, it had realised the ambition of some of its early promoters, and had acquired a commanding position in the commercial, industrial, and financial life of Scotland. By the success of its policy of amalgamation, it had become possessed of a continuous route from Carlisle to Edinburgh in the east, Glasgow, Paisley, and Greenock in the west, and Perth, Dundee, Arbroath, Montrose, and Aberdeen in the north. By the beginning of 1869, the dream of the Dumfriesshire gentlemen who had enthusiastically originated the project was realised, and the Caledonian Railway could proudly boast that it was in all truth a "National or Scottish Railway."

Assured as was the position of the Caledonian Railway in 1869, it did not rest upon its laurels. Under enterprising, energetic, and prudent direction and management, it continued to add to its system, in all directions holding out inducements for possible traffic, but as this article treats more particularly of the inception of the Caledonian Railway, reference to later extensions, etc., would be out of place here.

The following is a further list of amalgamations. The Crieff and Methven Railway, a line from Crieff to Methven, where it joins the Methven branch, and forms a direct line from Perth to Crieff. The Solway Junction Railway the Caledonian Railway's main line at Kirtlebridge, across the Solway Firth to Brayton, in Cumberland, connecting there with the Maryport and Carlisle Railway. The Busby Railway from Kilmarnock Joint Railway, near Pollokshaws to Busby and East Kilbride. The Alloa Railway from the South Alloa branch of the Caledonian Railway crossing the River Forth by a viaduct to the town of Alloa. The Glasgow Central Railway from Rutherglen to Stobcross and Maryhill. The greater portion of this line is underground. It serves the Queen's Dock, Glasgow. Prior to its construction, the only access the Caledonian Railway had to Queen's Dock and the west and north-western parts of Glasgow was over the North British Railway's metals. The Central Railway also forms the trunk of the Caledonian Railway's line down the north bank of the River Clyde, and up the Vale of Leven to Loch Lomond. The Moffat Railway is a short branch from the Caledonian main line at Beattock to the watering-place of Moffat. The Wemyss Bay Railway, from Port Glasgow to Wemyss Bay, on the Firth of Clyde, gives an additional route to the coast towns. The Forfar and Brechin Railway connects the town of Brechin with Forfar on the main line of the Caledonian Railway. The Crieff and Comrie Railway was added to the Caledonian system in 1898, connecting Crieff with the village of Comrie, and four years later the Lochearnhead, St. Fillans, and Comrie extension was completed. This line runs from Comrie to St. Fillans at the lower end of Loch Earn, thence up the side of the loch to Lochearnhead, and thence to Balquhidder, where it joins the Callander and Oban line. For picturesque scenery this line is hard to equal in any part of the world, and it also completes a connection between Dundee and Perth on the one hand, and Oban and the West Highlands on the other, without the necessity of coming south to Dumblane. Finally there is the Paisley and Barrhead District Railway runs from Paisley to Barrhead, and thence to Lyoncross, where it joins the Lanarkshire and Ayrshire Railway, and forms an alternative route from Glasgow and the east and south to Ardrossan, Greenock, Gourock, and the coast.

The foregoing are all Caledonian lines, but the following railways are also worked and partially owned by the same railway. The Callander and Oban Railway, from Callander to Oban and Ballachulish. The Killin Railway from the Callander and Oban Railway to Loch Tay. The Cathcart Railway, a suburban circular line on the south side of Glasgow. The Lanarkshire and Ayrshire Railway from the Caledonian line, near Whitecraigs, south of Glasgow, to Ardrossan, Irvine, Kilbirmie, etc. The Lanarkshire and Dumbartonshire Railway from Glasgow to Dumbarton, giving connection there with the Dumbarton and Balloch Joint Railway, which extends to Balloch pier on Loch Lomond. The Brechin and Edzell Railway from Brechin runs to the village of Edzell in Forfarshire. The Kilsyth and Bonnybridge Railway runs along the valleys of the River Kelvin and the River Carron to the Denny branch of the Caledonian Railway.

The joint lines in which the Caledonian Railway is interested are the Glasgow and Paisley, belonging to the Caledonian and the Glasgow and South-Western Railways, and forming a part of the routes of both railways to the coast. The Glasgow, Barrhead, and Kilmarnock Railway is owned by the Caledonian and the Glasgow and South-Western Railways. It runs from Glasgow to Kilmarnock, and has several short branches. The Dundee and Arbroath Railway, with a branch to Carmyllie, is owned jointly by the Caledonian and North British Railway. The Portpatrick and Wigtownshire Railway is an important line from Castle Douglas to Stranraer and Portpatrick and to Wigtown and Whithorn. It is owned by the London and North-Western, Midland, Caledonian, and Glasgow and South-Western Railways. The Dumbarton and Balloch Railway belongs to the Caledonian and North British Railways, and gives connection with the steamers on Loch Lomond. The Glasgow and Renfrew Railway runs from the Glasgow and Paisley Joint Railway, and is owned by the Caledonian and Glasgow and South-Western Railways. The Prince's Dock Railway is a short branch to Prince's Dock, Glasgow, and it is jointly owned by the Caledonian, North British and Glasgow and South-Western Railways.



THE ORIGINAL GERMISTON VIADUCT ON THE WISHAW AND COLTNESS (NOW CALEDONIAN) RAILWAY, CONSTRUCTED OF TIMBER WITH STONE PIERS.

The foregoing lists of the Caledonian Railway's main lines, branches, and connections may tax the reader's patience, but if he takes the trouble to follow them on a good map, he will readily see how wonderfully skilfully the whole vast system has been pieced together. The amalgamations of lines into the Caledonian Railway system have been given in this article as nearly as possible in their chronological order, and, following them upon the map, it is easy to trace how one extension has led to another. The worthy Dumfriesshire landowners who launched the Caledonian Railway, little thought that fifty or sixty years later it would be a vast system prepared to undertake anything that is considered conducive to the extension of its traffic in the future' and for the maintenance and retention of the enormous traffic it now holds. Much of the earlier discussion that took place among the first promoters, prior to the formation of the Caledonian Railway, was carried on in the coffee rooms of small inns in Dumfries and Lockerbie. Could the shades of some of these pioneers re-visit this earth, and travel over the Caledonian Railway system, on its railway lines, its steamer lines, and its coaching lines, and then meet in one of the railway's palatial hotels, what a fund of material they would have for discussion!

To this welfare the Caledonian Railway has contributed its full share; it has quickened, by distributing, the productive energy of the people, and developed the otherwise valueless natural resources of the country through which it passes. Its organised summer tours through picturesque Scotland have introduced elements of enjoyment and recreation into the monotony of City life. Through its partnership in the famous West Coast Service between England and Scotland it has helped to "weave a network of fellowship" between the people of the two countries, without which our national material prosperity would be a mockery. When the Caledonian Railway's share in the progress of the country is kept in view, this slight notice of its early struggle for existence and later development, from one whose family was closely associated with the railway during the years of its greatest growth, may not come amiss in the year of its "Diamond Jubilee."

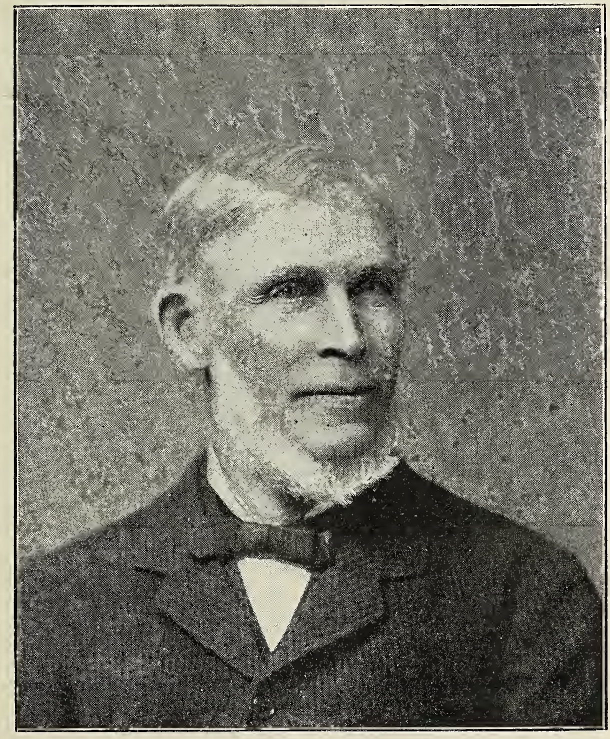
INTERIOR OF THE CENTRAL STATION, GLASGOW, PRIOR TO THE RECENT ENLARGEMENT.

THE JUBILEE OF THE CALEDONIAN RAILWAY

(THE CAREER OF MR. G. GRAHAM, M.I.C.E.)

By J. Hastings, *Engineers' Dept., Caledonian Railway*

THE Act of Incorporation of the Caledonian Railway is dated July 31st, 1845. As stated in the Railway Magazine last month, the movement which eventually resulted in the Act being obtained began as far back as 1836. At that time the railways between London and Lancashire were approaching completion, and the Directors of the Grand Junction Railway instructed their engineer, Mr. Joseph Locke, to report on the feasibility of a line from Preston to Edinburgh and Glasgow, which he did in February of that year. He favoured the route up Nithsdale, because of the steep summit up the Evan Valley above Beattock.



Yours faithfully

Geo. Graham

Chief Engineer, Caledonian Railway

No one at that time believed that more than one railway between England and Scotland would pay, or that even that one line could be made without assistance from Government.

Mr. Locke's report came under the notice of Mr. Hope Johnstone, M.P., who sent it to Mr. Stewart, his estate factor. Mr. Stewart's keen foresight saw at once the immense benefits that would accrue to the district from railway communication, and believing that the difficulties of the Beattock slope were greatly over-estimated, set to work to bring others to his conviction. He put himself in communication with Mr. Locke and the Grand Junction Chairman, as also some of the Lanarkshire gentlemen interested.

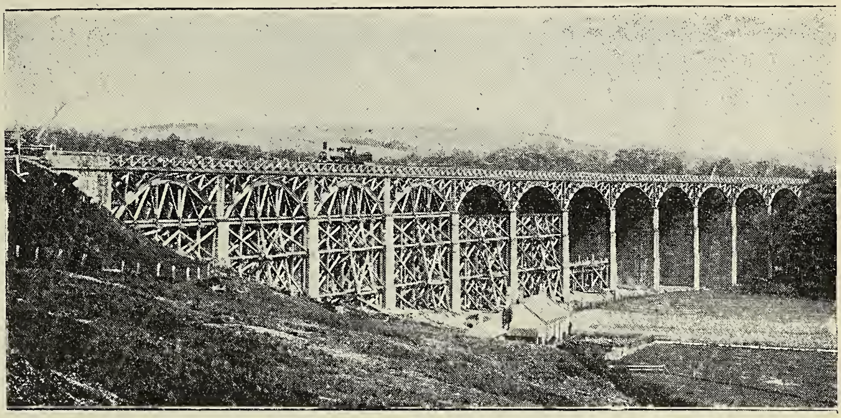
In September, 1836, Mr. Hope Johnstone called a public meeting at Dumfries, when a Committee was appointed to further the objects aimed at. At the instance of the committee Mr. Locke again surveyed the country, and his fear of steep gradients having lessened, he was able to report in November, 1837, in favour of the Beattock route, it being nearly twenty miles shorter than up Nithsdale. On the other hand, the Glasgow merchants had just got an Act for the construction of a line to Ayrshire, and the Glasgow influence preponderated in favour of continuing the Ayrshire line southwards down the Nith Valley. A great deal of negotiation took place between the Annandale and Glasgow gentlemen, resulting in Mr. Locke and Mr. Miller being appointed to make exhaustive surveys of the routes. It was not till March, 1840, that they sent in their reports, the former recommending the Annandale line, while the latter favoured the Nithsdale route, so that matters were little advanced. Meantime, however, in 1839, Government had appointed Sir Frederick Smith, R.E., and Dr. Barlow as Commissioners to report on railway communication between London and Dublin, Edinburgh, and Glasgow.

The Commissioners heard the contending parties, Mr. Stewart marshalling the evidence and drawing up the report to the Commissioners, and putting it before them with great ability. On March 15th, 1841, they issued their report in favour of the Annandale line, and stated that, "should any parties be ready to undertake its execution, they would certainly be entitled to every facility from Government, provided security were given to complete the whole line to Lancaster." The Ayrshire Committee would not agree to this, and both parties continued to prosecute their respective schemes. The Edinburgh party was divided in their support, inclining more to the projected East Coast scheme. The money market was also in a depressed state, great difficulty being experienced in getting funds to complete the railways already sanctioned in Lancashire; so that the matter remained in abeyance till 1844, when the great "Railway Mania" set in. On January 16th of that year a meeting was held at Lanark of the Annandale and Lanarkshire gentlemen, and resolutions adopted in favour of the Annandale and Clydesdale line. A further meeting, with the same object, was held in Lockerbie on February 1st, and on the 21st of the same month a meeting was held in London, and a general committee formed to carry out the objects in view. The prospectus of the Caledonian Railway was issued on March 27th, 1844, and in it the distances between London and Edinburgh and Glasgow by the various projected railways were given as below.

FROM	By Ayrshire and Dumfries.	By Newcastle and Berwick (North British).	By Caledonian.	Difference in favour of the Caledonian over the North British.	Difference in favour of the Caledonian over the Ayrshire and Dumfries.
LONDON TO EDINBURGH ..	477 miles.	417 miles.	407 miles.	10 miles.	70 miles.
,, GLASGOW	434 ,,	464 ,,	410 ,,	54 ,,	24 ,,
,, PERTH	492 ,,	493 ,,	450 ,,	43 ,	42 ,,

Lord Belhaven was chairman, and over seventy other gentlemen connected with Glasgow, Lanarkshire, and Annandale formed the provisional committee. Plans were lodged in Parliament for the line. The Nithsdale promoters also brought in their Bill, and the battle began in earnest. It has been described as one of the severest railway struggles in the history of this country. Wednesday, May 7th, 1845, was the first day of the contest. The great preponderance of the Glasgow evidence was for the Nithsdale line. Edinburgh was more divided. The opposing counsel made much use of Mr. Locke's first report against the Beattock summit, and suggested a better line up Nithsdale and through the Dalveen Pass. On May 27th the Committee adjourned to get a survey made of the Pass. On June 3rd the engineers reported, Mr. Miller believing the Pass practicable. Mr. Locke, on the other hand, strongly objected to it as being an inferior line, greater expense, and the gorge liable to be filled with snow in winter. After further procedure, the Committee on June 6th found the preamble proved, over eighty witnesses being examined. The contest was resumed before the Lords' Committee on June 27th, when 115 petitions were presented in its favour., The preamble was proved July 5th, and the Act passed July 31st, 1845, having cost the Caledonian Railway about £75,000. Mr. Stewart, in his strong advocacy of the Evan Valley line, laid himself open to the pencil of the caricaturist, who portrayed him as pushing a wagon up the Beattock incline to assist the locomotive, and attempting vainly to gather up the potatoes that fell off.

The Parliamentary fight over, the Directors lost no time in commencing operations. The first sod was cut in Annandale by Lady Jane Johnstone Douglas on October 11th, 1845. The contractors were Messrs. John Stephenson and Co. (Mr. Brassey being the principal partner), and the work was carried on with extraordinary vigour. This firm at one time had contracts for over 250 miles of railway from Lancaster to Forfar besides branches. The Caledonian section alone, including the Clydesdale Division, was 136 miles, in which the earthwork was about 8,400,000 cubic yards, with 239 large culverts, 333 bridges, and also 23 viaducts, comprising 154 arches, from 15 to 120ft. high, with spans from 20 to 100ft. The engineer reported in August, 1847, that over 20,000 men were at work, with 3,500 horses and four locomotives. In those early days there was a greater desire with railway engineers to avoid curves in laying out their lines, and so straight were many of the portions of the line from Carlisle to Beattock that it was called by Mr. Stephenson the "galloping line."


THE WOODEN GLENURY VIADUCT, CALEDONIAN RAILWAY
(Shored up, preparatory to rebuilding in steel, June, 1884)

A trial trip with two engines and a large number of wagons was made from Carlisle to Beattock on August 26th, 1847, and on September 9th a formal opening was made by running a train from Beattock to Carlisle and back, the trip being performed in less than two hours each way.

The first part of the line from Carlisle to Beattock was opened on September 10th, 1847, the first train being started by Mr. George Graham, the veteran engineer-in-chief, who has occupied that position since 1853, and who was then a young man on Mr. Locke's staff. On the jubilee of the event a dinner of the engineering staff took place, and Mr. John Cochrane, Superintendent of Works, on their behalf, presented Mr. Graham with a silver commemoration cup and two companion vases, each bearing the following inscription:—

> "Presented to George Graham, Esq., M.I.C.E., by the staff of the Engineering Department of the Caledonian Railway Company, as a mark of esteem, and to celebrate the jubilee of the occasion of his starting the first passenger train run on the Caledonian Railway on September 10th, 1847. Glasgow, September 10th, 1897."

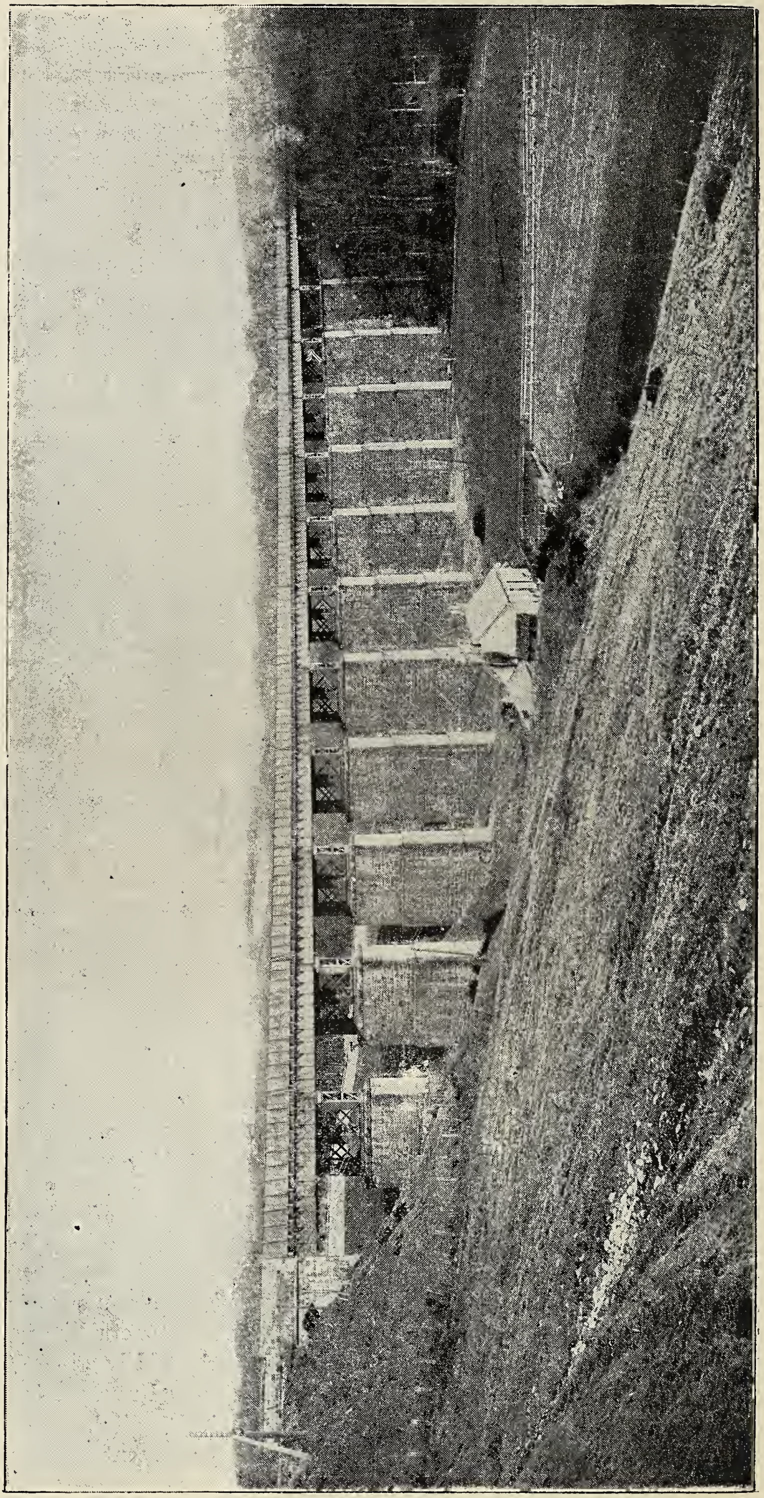
During the half-century of its existence the Company has extended its line north, east, and west, the present length, including joint lines and lines worked by the Company, being nearly 1,100 miles.

Of the names on the original prospectus only some four are now known to be alive.

Mr. Locke had a most intimate knowledge of Scotland, and he mapped out the Caledonian line and branches very much as they have been actually constructed, and no greater proof could be given of its progress than that its annual revenue is now far in excess of its original capital.

The present seems a fitting occasion to give a few reminiscences of the career of Mr. George Graham, the Engineer - in - chief, who has been connected with the Company during the whole period of its existence.

He began life as a mechanical engineer in the works of the late Mr. Robert Napier, the famous engineer, at Glasgow, and while there he worked with his "'prentice hands" at the first Cunard engines. His health, however, gave way, and he returned to his native Annandale, for which he has always cherished the warmest regard, and which advancing years have only served to intensify. In the summer of 1845, his health being re-established, his friends, some of whom were promoters of the railway, got him engaged as an amateur (as they all were) to do some work in connection with the promotion of the line. He was thus early brought into contact with Mr. Locke, and, as above mentioned, was fortunate in joining his staff shortly afterwards.



THE NEW (STEEL) GLENURY VIADUCT, NEAR STONEHAVEN, CALEDONIAN RAILWAY
(Designed by Mr. G. Graham)

The times were stirring, and Mr. Graham was engaged partly in Parliamentary work, and on the works of the railway and branches, under Mr. John Collister, chief resident engineer in charge.

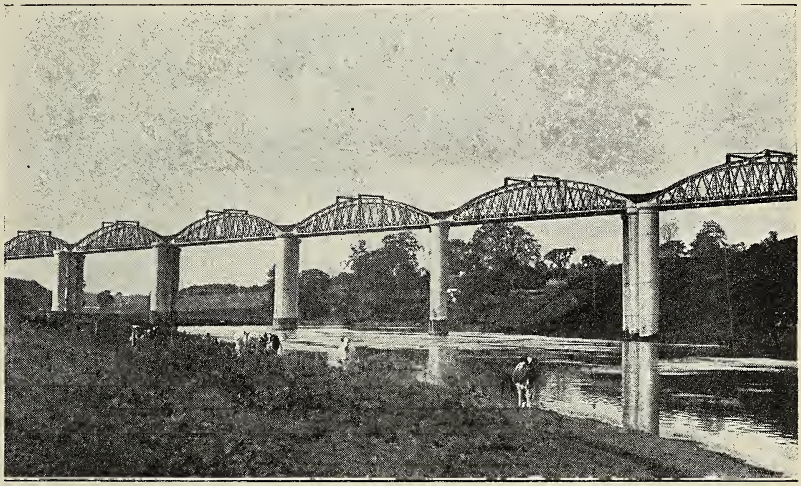
The Caledonian Company, having got their Act in 1845, had still to fight the Glasgow and South-Western Company, and the now North British Company. Both the Companies succeeded in getting their lines made, and they form competing routes with the Caledonian.

The inhabitants of the districts almost to a man took the part of the railways projected through them, and Mr. Graham can tell of many exciting incidents encountered by the Caledonian surveyors, who were sometimes assaulted, and how they were watched to keep them on the highway.

On one occasion at Sanquhar a Caledonian surveyor was obstructed, when he threatened to shoot one of the crowd with his "level," and rather frightened them, but they soon saw through this manœuvre, and eventually broke it. Sanquhar seems to have had an extreme antipathy to the Caledonian, as on another occasion, when Mr. Graham was examining the Nithsdale plans at the Sheriff Clerk's office, the staff came to stare, but said nothing. The Sheriff Clerk's wife, however, used her tongue, and rallied him about the Caledonian line, saying it would be snowed up in winter, and they would require to use the competing line for two months in the year, a prophecy which has happily proved incorrect.

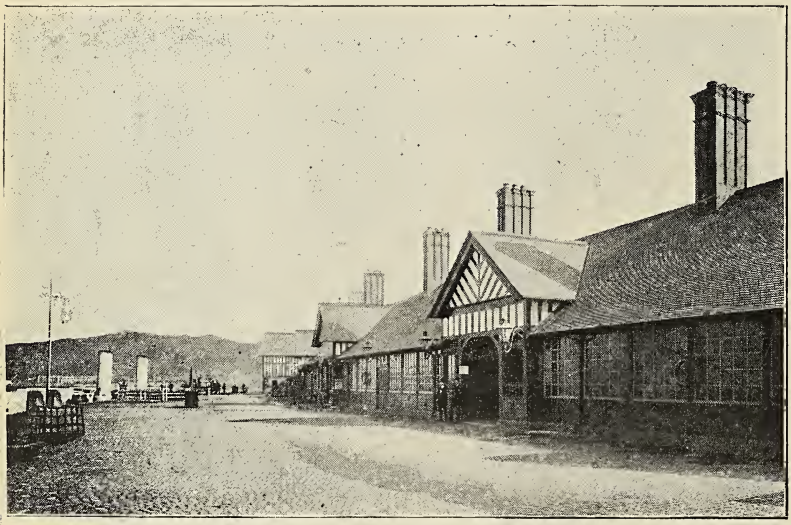
In 1847 "the railway mania" was at its height, and during the Session eight Acts were passed, undertakings now amalgamated with the Caledonian, comprising 106 miles of railway, which were not made for many years afterwards. After the opening of the Caledonian line, Mr. Graham was engaged in setting out some of these lines till November, 1847, when he was called to Glasgow and employed on unfinished work of the railways, stations, and on surveys.

Great exertions had been made to complete the line, which was opened with many of the stations and other works unfinished, and the traffic not having had time to develop, there was apparently no likelihood of it paying. The directors had also leased various other lines which became a burden on the Company.



CLYDE VIADUCT, ON THE DOUGLAS BRANCH OF THE CALEDONIAN RAILWAY
(Designed by Mr. G. Graham)

No new works were executed, except those really needed to complete the line, so that little engineering work was done for some years. The maintenance was also let by contract to Mr. Brassey. The affairs of the Company were in a very embarrassed condition, and most of the original directors resigned in 1850. It was not till 1851 that, by the Arrangement Act, the Company's affairs were put on a more satisfactory footing. Mr. Collister retired in 1852, when Mr. Robert Sinclair was put in charge as general manager and engineer, with Mr. Graham as his assistant. This continued till 1853, when Mr. Graham was appointed engineer in charge. At that time the length opened was about 195 miles. The Company has now lines opened to the extent of 777¼ miles, and including joint lines and lines worked 1,066 miles. In addition to the various branches constructed by the Company since 1853 (several of them made under the charge of Messrs. Blyth and Cunningham), the Caledonian Railway also includes the following: Hamilton and Strathaven, Biggar and Broughton, Dumfries and Lockerbie, Solway Junction, Busby, Scottish Central and branches, and Scottish North-Eastern and branches. The Forth and Clyde Canal was acquired in 1867.



GOUROCK STATION AND PIER, CALEDONIAN RAILWAY
(Designed by Mr. G. Graham)

For some time there was a large amount of work in renewing timber viaducts in a more permanent form—work of this kind having been done at a cost of over £300,000.

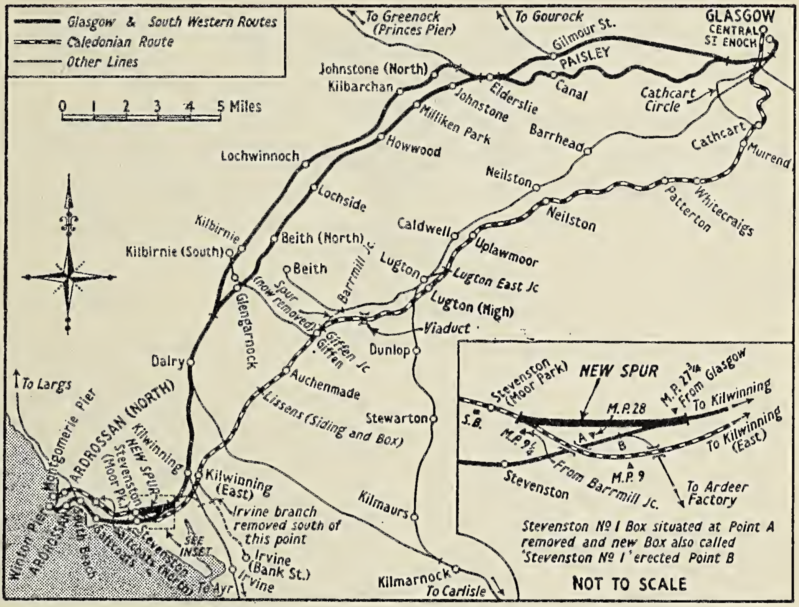
Mr. Graham continued in charge of the maintenance of the line and other lines worked till 1880, there being then 775 miles under his care, when two district engineers were appointed to superintend the maintenance. Among the various work he has constructed may be mentioned the bridge across the Clyde at Dalmarnock in 1861, consisting of three spans of 70 feet and four of 50 feet each, built on cast-iron cylinder piers, with malleable iron bowstring girders, believed to be the first of the kind in Scotland; also the Lanark and Douglas branches, over 10 miles long, opened in 1864, and which embrace a handsome viaduct across the Clyde, built on the same principle as the one at Dalmarnock, with six arches of 115 feet span. He has built six bridges across the Clyde. Since 1880 among important new works he carried out may be mentioned "the Glasgow Lines" of the 1882 Act, 4½ miles long, which skirting the east side of the city linked up the connection between the Clydesdale line on the south of the Clyde and the Garnkirk line on the north.

Then the extension to Gourock, 3¼ miles long, authorised in 1884, necessitated the construction of two tunnels, 2,100 yards and 460 yards long, with high retaining walls; as also a station and pier at Gourock, at once unique and commodious, and covering an area of about 20 acres, almost wholly banked up out of the sea.

Of the works Mr. Graham is at present constructing the most important are the lines from the Lesmahagow and Strathaven districts, about 30 miles long, to connect the Mid-Lanark coalfields with the Ayrshire ports; as also about 5½ miles of line around Motherwell and Wishaw.

In the course of his career Mr. Graham has been associated with a large number of officers of the Company, having had as contemporaries six secretaries, six general managers, and seven locomotive superintendents. Few men have been so long and actively connected with any large public Company as Mr. Graham. That he may long maintain his present vigour is the sincere wish of his many friends.

New Spur at Stevenston, L.M.S.R.



Railway routes between Glasgow and Ardrossan and the new spur at Stevenston

ON its formation, in 1923, the L.M.S.R. came into possession of two routes between Glasgow and Ardrossan Harbour — the Glasgow & South Western Railway route from Glasgow (St. Enoch) to Ardrossan (Winton Pier), *via* Paisley, and the Caledonian Railway route from Glasgow (Central) to Ardrossan (Montgomerie Pier), *via* Lugton. Connections in the neighbourhood of Glasgow enabled trains from the Central

Although the distance from Glasgow to Ardrossan by either route was approximately the same (32 miles), the G. & S.W.R. served several important towns, and had the advantage of far easier gradients. For some time after the grouping, full services were maintained by both routes, but the number of trains on the Caledonian route was reduced progressively, and on July 4, 1932, the local passenger services were withdrawn

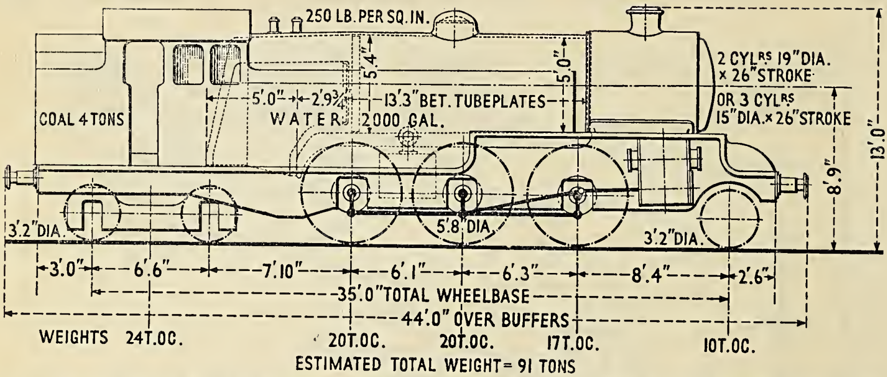


Fig. 8—2-6-4T for higher acceleration than " V3 " class on suburban services

engines. The first engine, No. 3401, *Bantam Cock*, was completed in February, 1941, and the boiler follows the design of the Pacific and " Green Arrow " classes, but is of smaller proportions, the maximum diameter of the barrel is 5 ft. 4 in., tapering to 4 ft. 8 in. at the parallel front-end course. The three 15 in. × 26 in. cylinders have 7 in. piston valves and drive 5 ft. 8 in. coupled wheels. The second engine, No. 3402, had an all-steel welded firebox with a single Nicholson thermic syphon, but this was replaced by a copper firebox in 1945.

While the " V4 " class engines were under construction, the provision of a 2-6-4 tank engine again came under review. The proposed engine (Fig. 8), which was intended to give a higher acceleration than the " V3 " class 2-6-2s for suburban services, had 5 ft. 8 in. diameter coupled wheels, and was of unusual design for a tank engine, in that it was fitted to have a wide firebox carrying a working pressure of 250 lb. per sq. in. The intention was to use the " V4 " class flanging blocks and to taper the barrel from 5 ft. 4 in. diameter to 5 ft. diameter at the smokebox. To compensate for the loss of water capacity resulting from the restricted tank dimensions in the region of the wide firebox, a two-cylinder design was considered, incorporating an additional rectangular tank fitted across the frames between the driving and trailing coupled wheels. This proposal used the " A4 " class outside cylinders, increased to 19 in. diameter, giving a tractive effort of 29,330 lb. A three-cylinder design, with reduced tank capacity, using the 15 in. diameter cylinders of the " V4 " class, was also prepared, giving a tractive effort of 27,420 lb. The emergency period created by the war prevented the further development of these, the last of Sir Nigel Gresley's designs.

Dec: 1901

The Development of the Caledonian Railway.

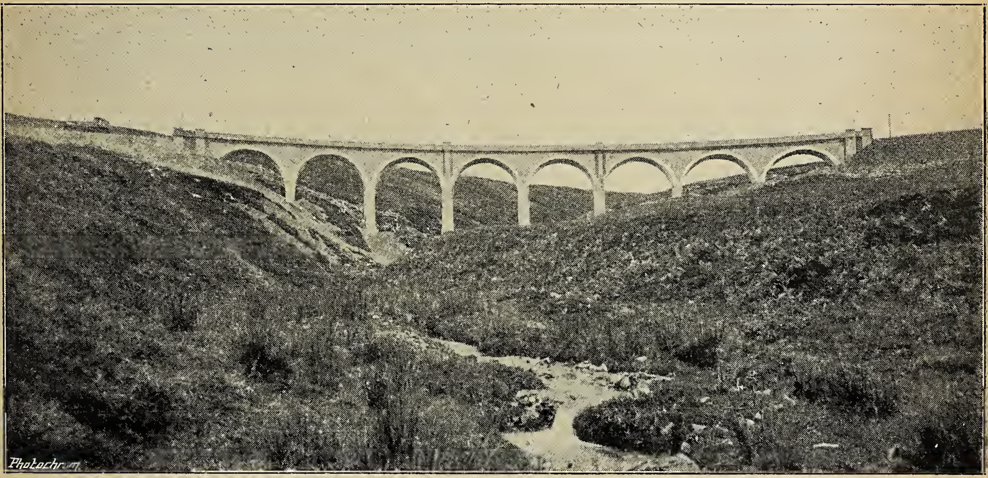
During the first year of the twentieth century the Caledonian Railway has added considerably to its mileage, and for the benefit of readers of the Railway Magazine we give the following particulars of these important extensions:—

The Shieldmuir, Wishaw and Newmains section of the Caledonian Railway was opened for traffic on October 1st. Considerable importance attaches to this extension, in respect that it gives direct main line connection with Wishaw Central, and will greatly assist in relieving the congested state of the traffic which occasionally arises in such a busy mineral district.

The line is divided into two portions, viz.:—From Shieldmuir to Wishaw Central, a distance of 60 chains, and from Wishaw Central to Newmains, a distance of 2 miles 27 chains, the total length being 3 miles 7 chains.

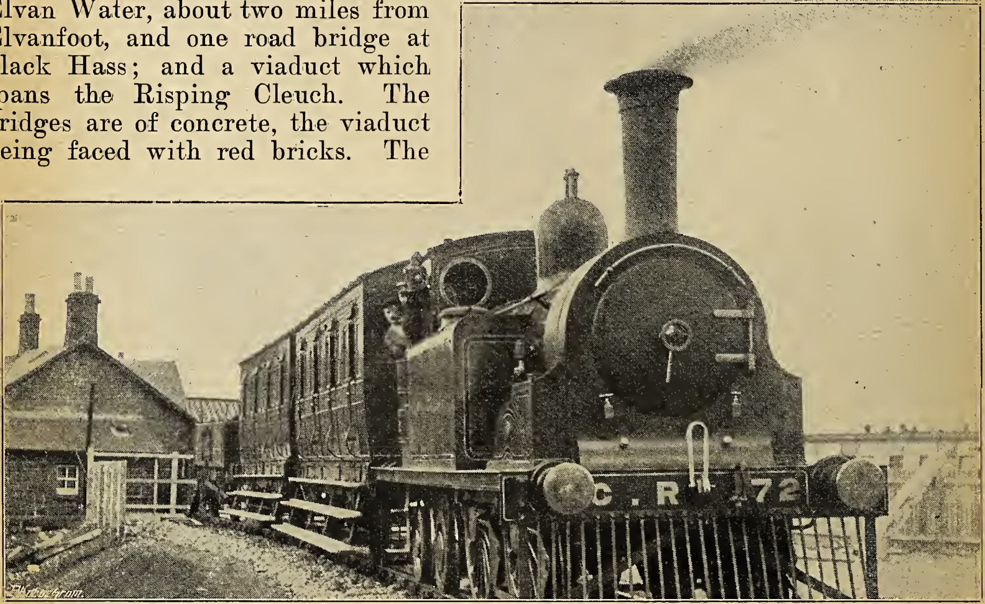
The Shieldmuir and Wishaw section commences by a junction with the company's Wishaw and Coltness Railway at Shieldmuir; thence it passes through Sunnyside, and joins the Wishaw Deviation Branch a little to the north-west of Wishaw Central Station.

The Wishaw and Newmains section leaves the Wishaw Deviation Line a little to the south-east of Wishaw Central Station, and after passing south of Wishaw it strikes in a north-easterly direction to Cambusnethan. Leaving the latter town, the line curves westward, and passes round by the south end of Coltness Ironworks, where it joins the Cleland, Newmains, and Morningside Branch. The new railway is constructed as a double line throughout. There are no stations on the section from Shieldmuir to Wishaw Central, but on the section from Wishaw Central to Newmains there is one situated at Cambusnethan, where the platform is of the "island" type, and the buildings are constructed of iron and wood, and fitted with all modern conveniences.



RISPING CLEUCH VIADUCT, LEADHILLS AND WANLOCKHEAD LIGHT RAILWAY.

On the same date also took place the opening of the Leadhills and Wanlockhead Light Railway. This is a line connecting the little village of Leadhills, in Lanarkshire, with the company's main line at Elvanfoot. Though the construction of the line has offered no special engineering difficulties, it is of interest in many respects. It is, so far as possible, a surface line, and contains but two bridges—one across the Elvan Water, about two miles from Elvanfoot, and one road bridge at Slack Hass; and a viaduct which spans the Risping Cleuch. The bridges are of concrete, the viaduct being faced with red bricks. The latter consists of eight arches of 50ft. span, its total length being 480ft. from abutment to abutment. Its height in the centre is 80ft., and altogether it forms a most effective and ornamental structure. About a mile from Slack Hass, on the gradually ascending line, and 5¾ miles from Elvanfoot, is situated the station of Leadhills, the present terminus of the line. The continuation to Wanlockhead will not be opened for at least three months.



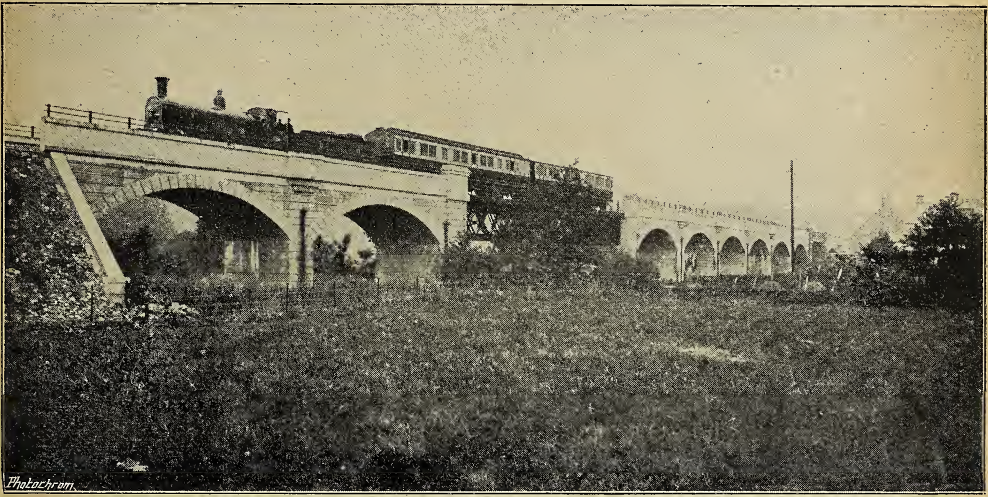
THE LOCOMOTIVE AND TRAIN FOR WORKING THE LEADHILLS AND WANLOCKHEAD LIGHT RAILWAY

The village of Leadhills is unique in many ways. It is the highest village in Scotland, not excepting Tomintoul, and is said to be the only locality in Great Britain where gold has in the past been found in sufficient quantities to be worked at a profit. It is the birthplace of William Symington, to whose inventive genius is owing alike the giant crusier and the ocean greyhound of to-day, in that he was the first to devise a vessel, the "Charlotte Dundas," to be propelled by steam.

From the design of Mr. John F. M‘Intosh, a special train and engine have been constructed for the working of this line, which are illustrated on this page. The little bogie tank-engine has cylinders 16in. diameter by 22in. stroke, and coupled wheels 5ft. in diameter, and is a side-tank locomotive, with trailing bogie. She has a cowcatcher front and rear—the first fitted to a railway engine working in Scotland. As our illustration shows, the four-wheeled carriages have two additional continuous footboards, and elongated, curved handrails. There is a service of three trains each way on week days, the journey taking 20 minutes from Leadhills to Elvanfoot, and 25 minutes in the opposite direction.

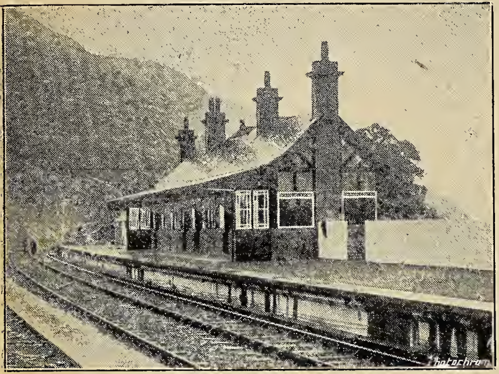
BRIDGE CARRYING THE LEADHILLS LIGHT RAILWAY OVER THE ELVAN WATER.

Another new line opened by the Caledonian Railway also on October 1st was the Comrie and Lochearnhead Railway—or rather, the section between Comrie and St. Fillans. A little to the west of Comrie Station the line crosses the river Lednock by a steel girder bridge; then passes along behind the garden ground on the north side of Drummond Street, until it reaches Dundas Street, which it crosses by a girder bridge. It is then carried along at the same level over a viaduct, consisting of nine concrete arches of 33ft. span, on to the river Earn, which is crossed by an 80ft. girder bridge. Onwards through the haugh lands of Ross, and over the Craggish Road, the line passes through a heavy rock cutting near Mill of Ross, and here also crosses the Aberuchill Road by a large bridge. The Earn is again bridged a little further on, near Tullybannocher Smithy. Descending by a gradient of 1 in 60, the line traverses the level lands of West Tullybannocher until it reaches near the east lodge of Dunira, from which point the public road between Crieff and St. Fillans is diverted for a distance of nearly a mile, the intervening space of from 20 to 30 yards between the road and the railway being planted with spruce and other fir trees to screen the railway from the road. At Dalchonzie there is a level-crossing over the Aberuchill Road, and here a signal cabin, a goods siding, and a double cottage, with red tile roof, for signalmen and platelayers, have been constructed. A short distance west of this crossing the rail-

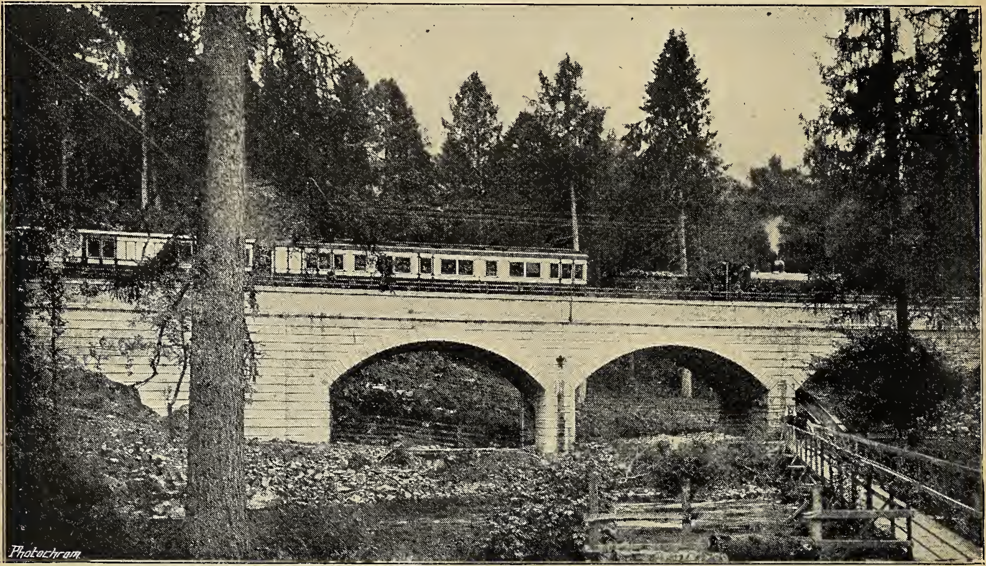


THE COMRIE VIADUCT ON THE LOCHEARNHEAD, ST. FILLANS AND COMRIE RAILWAY.

GIRDER BRIDGE CARRYING THE LOCHEARNHEAD, ST. FILLANS AND COMRIE RAILWAY OVER THE EARN NEAR TYNREOCH.



ST. FILLANS STATION.



THE SPECIAL INSPECTION TRAIN ON THE DUNDURN VIADUCT.

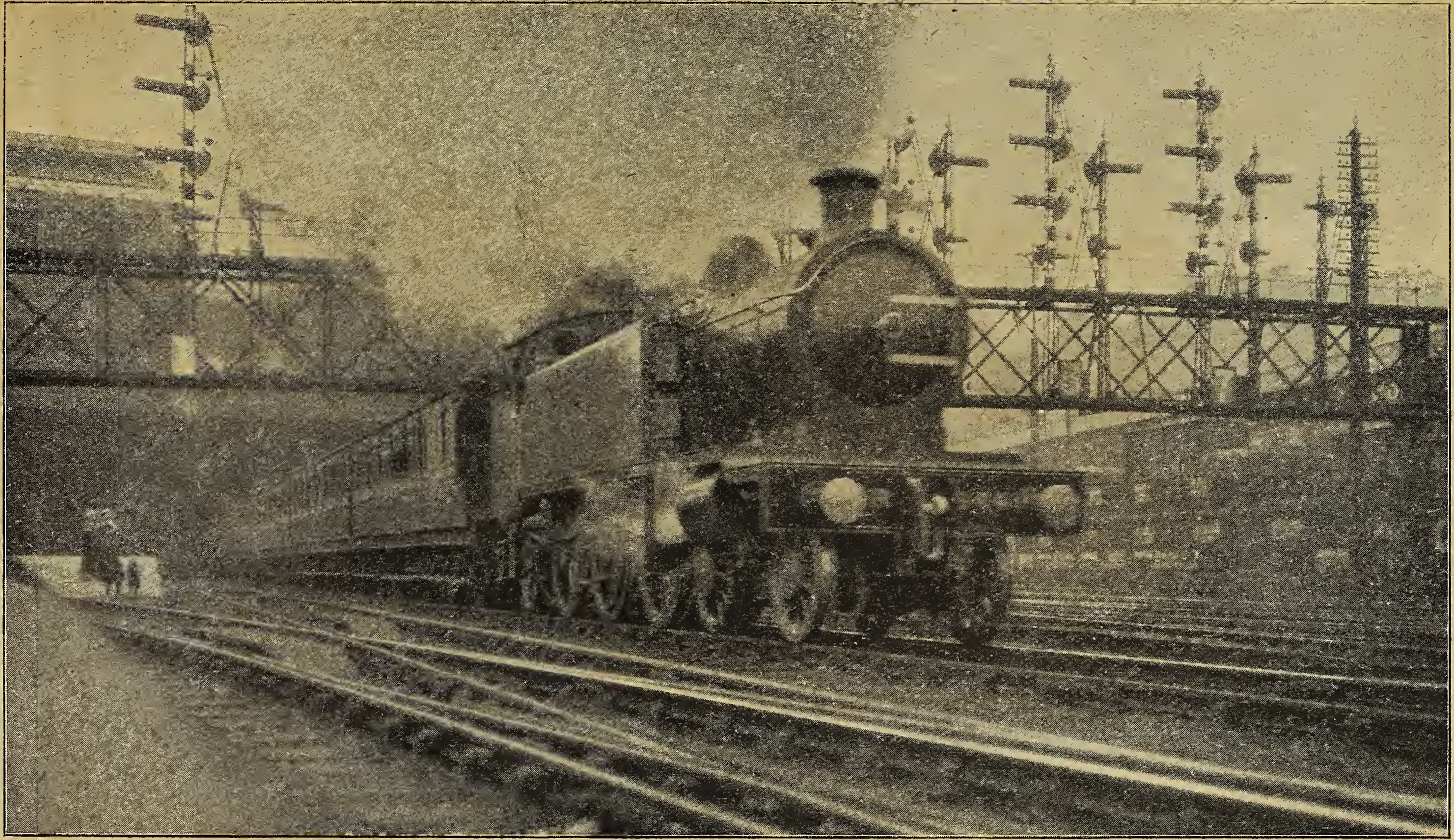
way crosses the Earn for the third time, and immediately after enters an immense rock cutting, which at one point is 40ft. deep, and there something like 40,000 cubic yards of hard, slatey rock had to be blasted. The line is within from 20 to 30 yards of the Earn, and passing along pretty glimpses of it are had. The journey onwards is through the comparatively level arable lands of Kindrochat and East Dundurn, until the line crosses the Earn for the fourth time near Tynreoch by a girder bridge of 117ft. span. Here the public road is also diverted for some little distance, the railway passing under it. The last mile of the journey is along the slopes of the hill on the north side of the valley, and gradually ascending on a gradient of 1 in 60 to St. Fillans, which is some six miles from Comrie. The station at St. Fillans is about 180ft. higher than Comrie Station. It is a neat, pleasing, and commodious building, with red brick walls, rough plaster panels, strapped with wood in the old English style, and roofed with red tiles. The double platforms—there is a passing place here — are spacious, and should accommodate the traffic for many years to come. On the north side the hill-side has been excavated into to form a goods yard. The station, standing high, commands a fine view of St. Fillans, and from it a new and spacious approach has been made, which strikes the main road at the east end of the village. On the west side of this approach there is a large extent of land, which, it is understood, is to be terraced and laid out for building—the ground is on the Drummond Estate. The railway has cost £78,000, or £13,000 per mile to construct.

Work is now being rapidly pushed forward on the other section of the line—that between St. Fillans and Lochearnhead—which is estimated to cost £113,000, or rather less than £13,000 per mile. The length is nearly ten miles, and will occupy from two and a half to three years in construction. The line is being carried through a tunnel, 62 yards long, behind the west end of St. Fillans, which will thus help to prevent the amenity of the village from being marred at that part. Along the north side of Loch Earn, at a distance of about 80 yards from the public road, the line will pass through a large extent of woodland on the hill-side. It will cross Glenogle on a viaduct of eleven arches, just to the west of Lochearnhead Hotel. There will be another viaduct at Edinchip, and the new line will join the Callander and Oban Railway near Lochearnhead Station.

The railway, when completed, will open up direct communication between the East and West Coasts of Scotland—from Dundee to Oban—thus saving the present detour via Dunblane.

* * *

WHERE THE CALEDONIAN INVASION OF ENGLAND IS CHECKED.



Photo] [Captain R. A. Chrystal.

CALEDONIAN RAILWAY.

Stopping train leaving Edinburgh for Glasgow.
4-6-2 tank locomotive, No. 944.

Sept. 1918

Six Years' Progress of the Caledonian Railway.

THE RAILWAY AND TRAVEL MONTHLY for October, 1912, contained an article descriptive of the 20th century development of the Caledonian Railway, which disclosed a remarkable advance in every department of this progressive Scottish railway.

During the six years that have elapsed despite the drastic restrictions that the war (which has been in progress for two-thirds of the period) has had on all railway evolution, not inconsiderable advances have been made in several directions in connection with the Caledonian Railway.

The engineering improvements have been of large importance.

A considerable number of old underbridges with cast-iron superstructures have been replaced by steel in order to keep pace with the increase in the weight and bulk of traffic. Of the larger structures so treated mention may be made of the Caldew Viaduct near Carlisle, the viaduct over the River Clyde at Coulter, the large one-span bridge over Windmillhill Street at Flemington, the flood-spans of the viaduct over the River Earn near Perth, the viaduct crossing the River North Esk at Marykirk, and the viaduct over the River Dee at Aberdeen.

The viaduct at Marykirk is about one-fifth of a mile long and has 13 spans of about 63 feet each. On this page is illustrated the old viaduct, whilst the view on page 146 shows the new Marykirk Viaduct. The viaduct over the Dee at Aberdeen, similarly treated, has 7 spans of about 67 feet each. In addition to these, the viaduct over the River Tay at Ballathie, near Cargill, having 5 spans of about 103 feet each, is at present undergoing renewal.

THE OLD CALEDONIAN RAILWAY VIADUCT AT MARYKIRK

A number of overbridges have also been renewed, including the Farmloan Road bridge and the Glasgow Road bridge, near Rutherglen, both of which, having to be lengthened and widened, had to be entirely reconstructed.

Among the important stations which have been entirely reconstructed are Aberdeen Joint and Aberdeen Goods (Caledonian), Stirling, Carstairs, Carluke, Slateford, and Port Glasgow,

At Aberdeen the passenger station, which is the joint property of the Caledonian and Great North of Scotland Railways, and forms the Northern terminus of the Caledonian Company's system. The new premises provide ample accommodation for the expansion of the rapidly increasing traffic of the "Granite City." This new station was fully described and illustrated in the RAILWAY AND TRAVEL MONTHLY for July, 1916. In connection with the alteration of the Caledonian Railway's goods station at Aberdeen, the new goods shed measures 320 ft. long by 260 ft. wide, and is equipped with electric hoists, electric pillar cranes, etc. In completely remodelling the goods yard, fish and other loading banks, as well as additional cartways, sidings and offices have been provided.

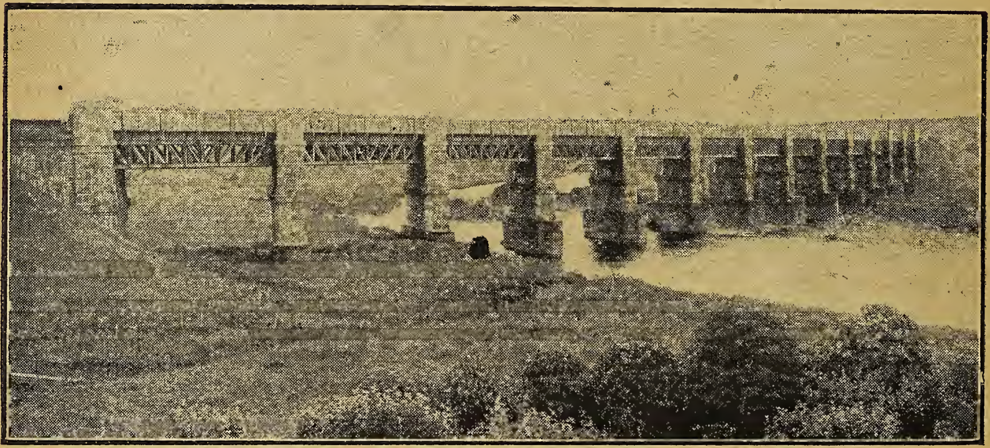
At Stirling a handsome station has been erected, the frontage of the main buildings—which, as will be seen from the photograph on page 147, is of the Scottish Baronial style—being in perfect harmony with the architecture of this historic town. Other features are the forecourt fronting the station, the circular concourse on the down main-line side (illustrated on page 148), the spacious luggage accommodation, the overhead passenger gangway, the roofing of the platforms, and the heating by vacuum steam of the various rooms and offices.

In connection with the reconstruction of Carstairs station the lines approaching the station were widened, which necessitated the building of a large overbridge at the west end of the station and a retaining wall alongside the public road, as well as extensive alterations of the permanent-way and signalling arrangements. A view of the interior of the old station at Carstairs is given on page 14 .

Considerable extensions have been made in the accommodation for the reception and marshalling of trains at Craiginches near Aberdeen, and Kingmoor near Carlisle, while widening operations are in progress on the southern section of the line between Rockliffe and Floriston.

New engine sheds have been built at Dalry Road, Edinburgh; at Balornock near Glasgow; and at Kingmoor. Carlisle shed has been entirely reconstructed.

A public road has been opened over Connel Ferry bridge, which carries the Ballachulish branch of the Callander and Oban Railway over Loch Etive.



THE NEW CALEDONIAN RAILWAY VIADUCT AT MARYKIRK.

As regards rolling-stock, there has also been a very considerable advance. Following up the success of the long-distance express "Grampian" corridor carriages having 68-feet bodies carried on two six-wheeled bogies, a new type of coach having a 57-feet-long body on two four-wheeled bogies has been introduced for shorter journeys.

In the matter of wagons, there has been a continuance of the principle of eliminating as far as possible the smaller classes of trucks by substituting standard wagons of about 10 tons capacity for goods and of 12 to 15 tons capacity for minerals. There has also been a considerable addition to the number of covered goods vans having a carrying capacity of 10 tons.

As befits a railway favoured with such a variety of industries within its territory as is found throughout the Caledonian Railway system, the building of special and unusual classes of wagons and trucks has been continuous; both for coping with the growth of existing traffic and the fostering of entirely new undertakings. Particularly has this been the case in recent years in connection with the fruitful fields afforded by the Clyde river and firth, and also the iron and steel districts of Lanarkshire.

The superheating of steam, adopted on passenger engines in 1911 and extended to goods engines in 1913, has proved so successful, that now almost all the main-line through passenger trains are worked by locomotives using superheated steam, while many of the express goods trains are worked on the same system.

EXTERIOR OF THE NEW STATION BUILDINGS, STIRLING.

Departing from its established practice of building all its heavy engines with inside cylinders, the Caledonian Railway has lately returned to its earlier practice, and put in service a class of heavy passenger tender engines, and a somewhat similar class of heavy passenger tank engine having outside cylinders. Both classes have six-coupled wheels, the centre pair of which form the driving wheels. These were both illustrated in the RAILWAY AND TRAVEL MONTHLY, April, 1917—the former by a large plate in facsimile colours, and the tank engine in monochrome.

A noteworthy feature of locomotive performance is the exceptionally good results which have attended the work done by passenger engines in the running of the many heavy goods trains for which they have necessarily been responsible in consequence of the reduced passenger service and the great increase in goods service through the war.

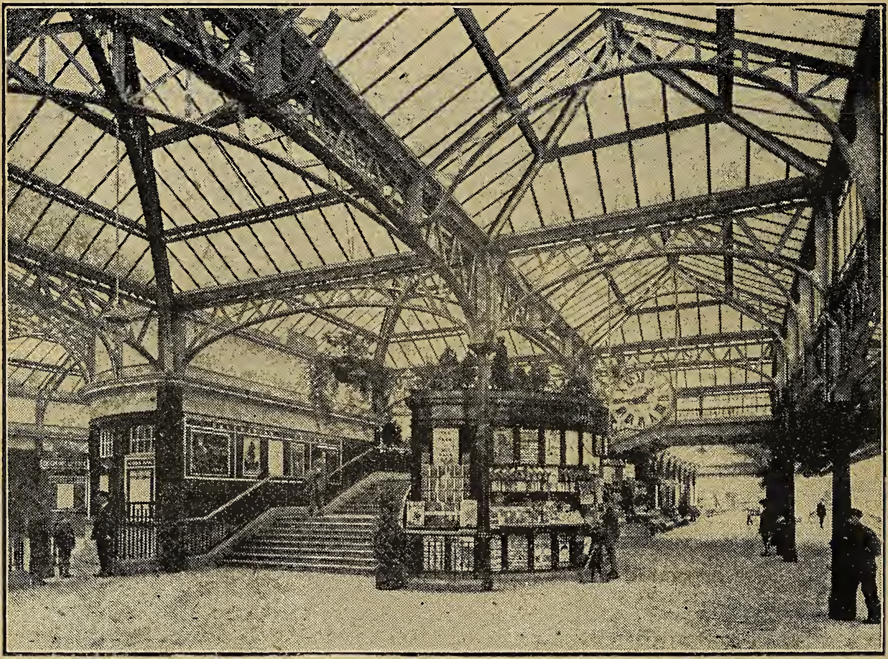
An outstanding innovation on the Caledonian Railway was the introduction of elegant and comfortable Pullman cars early in the summer of 1914. Pullman breakfast, luncheon, dining, and tea cars were run on the express trains between both Glasgow and Edinburgh and the North; while Pullman buffet cars were attached to seven of the express trains in either direction between Glasgow (Central) and Edinburgh (Princes Street). A Pullman buffet observation car—the first of its kind in Britain—was also run on the 8.0 a.m. train Glasgow (Buchanan Street) to Oban, and the 3.0 p.m. Oban to Glasgow. An additional attraction presented by these greatly appreciated cars lay in their being named after the choicest of Scottish heroines appropriate to the districts served, namely, "Annie Laurie," "Helen MacGregor," "Flora MacDonald," "Lass o' Gowrie," "Fair Maid of Perth," "Duchess of Gordon," "Maid of Morven," etc., It was unfortunate that the running of these luxurious cars consequent upon war travel conditions had unavoidably to be temporarily suspended, but their reappearance in due course will be welcomed.

In the autumn of 1912 was instituted a scheme of half-yearly educational examinations of the clerical staff on the result of which depends promotion to junior and senior clerkships and participation in the graduated scale of salaries fixed for the progressive stages in both sections. It is found that this scheme of examinations, besides raising the standard of intelligence and ability, serves to bring to light those members of the staff most deserving of further promotion.

In the spring of 1914 active steps were commenced for bringing under public notice the many excellent sites available throughout the Caledonian Railway's system for industrial and commercial works and other premises, with or without rail, canal, and dock siding connections.

In this way many enterprising firms have secured convenient communication with the principal coalfields, steel works, iron works, electric power works and general manufacturing works, and with the great cities and other centres of busy industry in the several districts of Scotland, as well as with the shipping ports of Great Britain and the markets of the world.

As to how the Caledonian Railway, since the fateful 4th August, 1914, has amply played its part in men and material in meeting the onerous and ever-changing requirements, can only be told after the termination of hostilities; suffice it to say that the active crusade carried on in connection with the exhibition of the ambulance train supplied by the Caledonian Railway to the order of the War Office for service in France, which was visited by 228,187 members of the public during the 29 days it was on view at the principal stations on the Caledonian Railway, permitted of the distribution from the admission receipts of the sum of £13,255 among the several local branches of the Red Cross Society.


THE DOWN PLATFORM, STIRLING NEW STATION.

It has also to be recorded that, in order to augment the nation's food supply at this time, the Caledonian Railway allows the staff to cultivate portions of its spare land free of cost, and thus there is now a total area of about 480 acres under cultivation in small allotments and otherwise.

The most important change that has taken place in connection with the Caledonian Railway directorate during the period reviewed by this article was the accession of Mr. Henry Allan (Deputy Chairman) to the Chairmanship of the Company, and of Mr. William Younger (Director) to the Deputy Chairmanship, consequent on the death of Sir Charles Bine Renshaw, Bart., in March of this year.

Mr. Donald A. Matheson, M.Inst.C.E., General Manager, assumed office in October, 1910, after having filled for a number of years the position of Engineer-in-Chief to the Company.

INTERIOR OF CARSTAIRS STATION, SHOWING THE OLD ROOF RECENTLY REMOVED.

In conclusion, it is interesting to recall that in 1911 the Caledonian Railway inaugurated a new era in railway advertising, which has had far reaching and gratifying results. By means of fastidiously designed and artistically prepared pictorial and letterpress posters, advertising of well-chosen resorts and districts, public interest was effectively aroused and stimulated in what has come to be widely known as the "True Line" which claims to ensure its patrons travelling with true convenience, true comfort, true economy, and "true to time." Prominent amongst these was a series of "Golfing Girl" posters, each depicting "The Golfing Girl" in distinctive golfing attitude on one or other of the numerous golf courses on the Caledonian Railway system. Others drew attention to the "delightful districts" served by Caledonian Railway trains; and some had for their theme the pleasures of mountain, loch and stream, long distance residential travel, and excursions across the Border, etc.

Supplemented by cheap "zone" weekly season tickets, cheap afternoon fares and similar facilities, convenient, comfortable and punctual trains, the passenger traffic grew enormously.

CHAPTER LVIII.

THE CALEDONIAN RAILWAY.

War-time traffic developments on the Caledonian Railway were of a character that had many distinguishing features, and they further assumed proportions which may fairly be described as phenomenal.

Forming with the London and North Western Railway the West Coast Royal Mail Route between England and Scotland, the Caledonian constitutes the main artery for traffic between Carlisle—where it joins the North Western—and Aberdeen, while at Perth it becomes, in combination with the Highland Railway, a link in the chain of communication with Inverness, Invergordon, Kyle of Lochalsh and other places in the North of Scotland which all rendered invaluable service during the war-period.

The Caledonian does much more than this, however. It serves such centres of traffic as Glasgow, Edinburgh, Dundee, Peebles, Falkirk, Leith, Grangemouth, Greenock, Wemyss Bay, Ardrossan and Oban ; it operates branches on both sides of the Clyde ; it has long derived much of its revenue from the great industrial and mining districts of Lanarkshire and Stirlingshire through which it passes, and even under normal peace-time conditions there were occasions when exceptionally heavy transport demands had to be faced.

What the said industrial districts represented from a traffic point of view will be better understood if the fact is added that there were already on the Caledonian system, when war broke out, thirty large engineering works, forty-three leading iron and steel works and thirty-five shipbuilding yards, apart from countless smaller concerns.

With the advent of war, the company had to deal with, among other developments of the situation, an enormously increased output from existing industrial establishments ; an immense production, in the aggregate, from new works set up for the occasion, including the national factories at Georgetown and Gretna, and an ever-flowing stream of Welsh coal for the Fleet, followed by another stream of empties going back for more. When, again, the enemy began to bombard towns on the East Coast, threatened to make raids on them, and became especially active in sending aircraft there, the naval and military authorities, with a view to greater security, showed a distinct preference for the West Coast over the East Coast route between England and Scotland, with the result that the Caledonian had to bear an exceptionally heavy burden in respect thereto until a more equal distribution could be arranged. Meanwhile, also, the wholesale requisitioning of steamers by the Government was already diverting to the Caledonian great volumes of goods and mineral traffic which had previously gone by water, while the position became still more

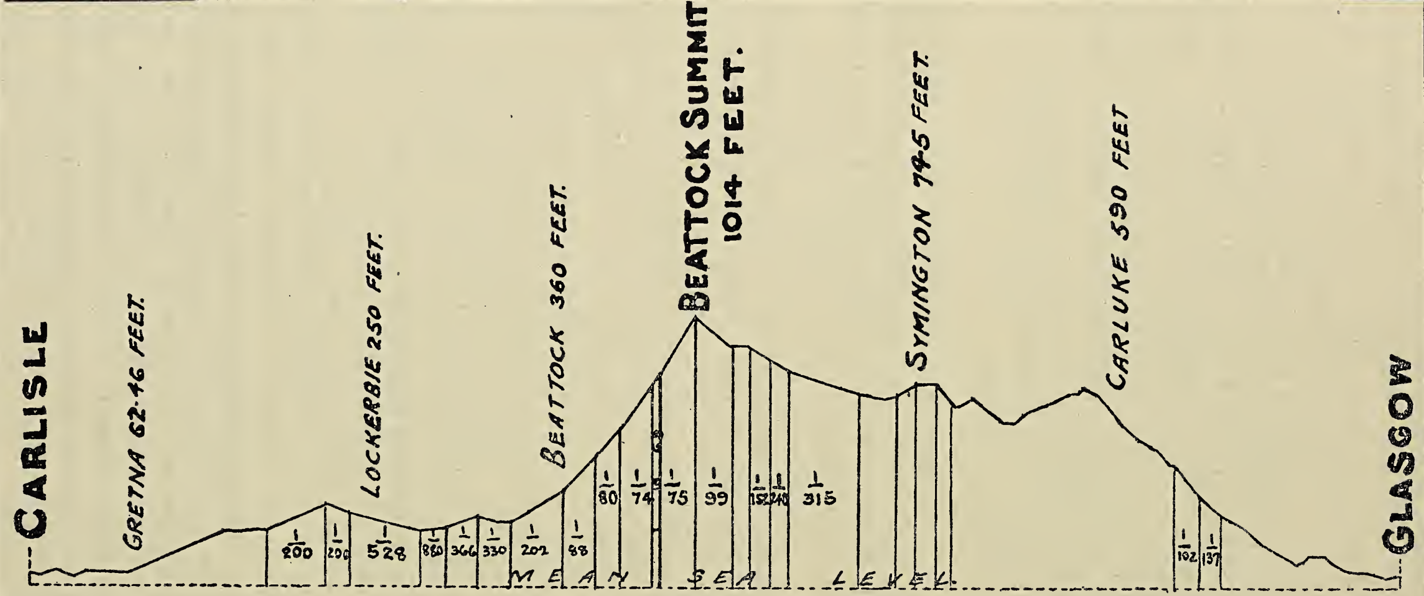


TABLE OF GRADIENTS (GROUPED) BETWEEN CARLISLE & GLASGOW EXPRESSED IN PERCENTAGE OF THE TOTAL DISTANCE.

STEEPER THAN 1 IN 75.	2·54%	2·60 MILES
FROM 1 IN 75 TO 1 IN 100.	12·66	12·92 "
1 IN 100 TO 1 IN 150.	14·63	14·91 "
1 IN 150 TO 1 IN 300.	35·00	35·70 "
1 IN 300 TO 1 IN 600.	18·86	19·24 "
LESS THAN 1 IN 600.	11·63	11·85 "
LEVEL.	4·68	4·78 "
	100·00	102·00 "

NOTE.
TOTAL LENGTH OF 1 IN 69 GRADIENT: 440 YDS.

SECTION OF CALEDONIAN MAIN LINE BETWEEN CARLISLE AND GLASGOW.

acute with the constantly-increasing menace of the enemy-submarine danger.

Such were the proportions attained by the traffic passing between England and Scotland by the West Coast route that in the twelve months ending December, 1918, the number of loaded wagons dealt with at Carlisle—a busy junction even under ordinary conditions—showed an increase, as compared with the corresponding figures for the twelve months ending December, 1913, of 91 per cent. in those going southwards and 162 per cent. in those going northwards. The number of loaded and empty wagons exchanged at Carlisle during 1918 between railway companies south and north aggregated over two and a quarter millions, and of this total 56 per cent. were wagons to or from the Caledonian line proper. In the latter case the bulk of the traffic had to pass over a 90-mile length of main line having long block-sections, few refuge sidings, and heavy inclines, included in the last-mentioned being the summit level of the Caledonian situate between Beattock and Elvanfoot, and attaining a height above sea level of 1,014 feet. In a distance of about ten miles from Beattock Station to Beattock Summit a rise of 600 feet is attained, the gradients varying from 1 in 75 to 1 in 80. Fifteen banking engines are employed to assist trains to surmount this elevation. Between Stirling and Kinbuck, a distance of seven miles, the gradients vary from 1 in 78 to 1 in 153, and four banking engines are employed. There are, also, other points on the Caledonian system where assisting engines are used for banking purposes, such as between Motherwell and Craigenhill, Carstairs and Beattock Summit (assisting engine in front), and Buchanan Street Station (Glasgow) and Robroyston.

A line thus situated, and operating under these conditions, should be able to give a good account of services rendered in defence of the national interests and of all that was at stake in the Great War. Let us, then, see what the Caledonian's story really is.

MOBILISATION.

To begin with the beginning of the war, it may be stated that the order for mobilisation in the early days of August, 1914, found the Caledonian Railway Company fully prepared to perform their part of the national mobilisation programme, and the arrangements in which they were concerned were carried through in schedule time and without a hitch. During the same month of August the Caledonian dealt with 342 naval or military trains, the majority of which originated on their line. The rolling stock thus had to be supplied by the company, and not only had most of the trains to be loaded on the Caledonian system, but in many cases they were unloaded thereon, as well. All this was, of course, a very different matter from simply receiving trains from one company and passing them on to another. The fact, also, that mobilisation movements consisted of a few movements on a large scale rather than a series of regular movements on a small scale added considerably to the difficulties of the situation.

In the course of one Saturday afternoon and Sunday forenoon during the mobilisation period no fewer than thirty-four military trains were loaded and dispatched from Perth, ten from Stirling and eleven from Blairgowrie. The trains consisted of carriages for officers and men, wagons for equipment, lorries, guns, etc., and cattle trucks for horses. The loading of all these varieties of traffic within so short a time from passenger platforms, goods-loading banks and cattle-loading banks of varying heights and widths, and amidst the additional pressure of dealing with many ordinary trains, constituted in its way a distinctly notable achievement.

Scottish Industries and the War.

For those industrial organisations on the Caledonian system of which mention has already been made, the outbreak of the war brought a period of extreme activity. Extensions of premises became in many instances a matter of urgent necessity. The great establishments in Lanarkshire and on the Clyde increased their production many times over. Other works, and especially iron and steel works, which had long been more or less idle became hives of strenuous industry. Nor did these developments suffice in themselves, since many new works, great or small, had to be provided as well. Soon, also, the number of trains required to deal with all the traffic arising in these and other directions became so great that it was only by careful organisation and a supreme and sustained effort on the part of the operating staff that the Caledonian was able to keep the traffic moving and prevent the chaos that might, otherwise, easily have arisen.

By way of showing, in the first place, how existing works on the Caledonian system were affected, reference might be made to the large steel-works, at Motherwell, of Messrs. David Colville and Sons—who also have works at Clydebridge (Rutherglen), and Glengarnock (Ayrshire)—and the engineering and other works of Messrs. William Beardmore and Company, Ltd., at Parkhead (Glasgow), Dalmuir and Mossend, the increase in business in each instance being very substantial alike for the firm and for the Caledonian Railway Company.

In the early days of August, 1914, Messrs. Colville employed at their Motherwell works some 2,800 hands. By 1918 this number had increased to about 9,000. This fact, in itself, is suggestive of a great expansion in the business done; but still more convincing evidence is afforded by the following figures, giving the tonnage of the principal traffics passing to or from the works between the years from 1914 to 1918 inclusive:—

Year.	Traffic Forwarded. Tons.	Traffic Received. Tons.
1914	244,360	690,247
1915	359,452	958,494
1916	411,785	1,037,490
1917	413,167	1,010,807
1918	375,336	996,699

Practically the whole of the output—which included shell bars, special aircraft steel and bullet-proof plates—was for the purposes of the war. At the same company's Clydebridge steel-works, Rutherglen, the output of steel rose from 28,600 tons for the year ending December, 1915, to 143,219 tons for the year ending December, 1918.

Messrs. Beardmore and Company, in addition to all they had to do in connection with their large engineering works at Parkhead, Glasgow, their steel-works at Mossend and their shipbuilding works at Dalmuir, undertook the management of various National Projectile Factories for the Government. One of the features at the Parkhead works was the manufacture of naval guns. The production of these during the period of the war included the following :—

Size of Gun.	Weight of Gun. T.	Weight of Gun. C.	Number made.
15-inch	100	—	38
13·5 inch	74	—	2
12-inch	67	—	7
9·2 inch	32	15	12
7·2 inch	13	10	9
6-inch	6	—	30
12-pounders	—	11½	300
18-pounders		8¾	2,000

At Dalmuir the same firm's output included 800 6-in. guns ; 360 18-pdr. guns ; 740 6-in. gun-carriages ; 210 6-in. gun-carriage limbers ; 360 18-pdr. gun-carriages ; 810 18-pdr. gun-carriage limbers, and 810 ammunition wagons.

Works which continued operations—though on a greatly expanded scale—along lines already more or less familiar to them, were, in proportion as the war increased in gravity, supplemented alike by entirely new factories established for the express purpose of supplying munitions and by the activities of various concerns which, previously occupied in entirely different pursuits, now also took up that class of production.

EXPLOSIVES FACTORIES.

Prior to the war there were only two works on the Caledonian system engaged in the manufacture of explosives, those, namely, of the Midlothian Gunpowder Company, at Harburn, in the county of Edinburgh, and those of Messrs. Nobel's Explosives Company, Limited, at Stevenston, Ayrshire. The latter works (which are also connected with the Glasgow and South Western Railway Company's line), were greatly extended during the war. The employees numbered, at the busiest period, about 7,600.

When the Armistice was signed the explosives works and filling factories on the Caledonian numbered seven. Two of these, both under direct Government control, call for special mention—the Scottish National Filling Factory at Georgetown, near Paisley, and the Explosives Factory at Gretna, near Carlisle.

GEORGETOWN SCOTTISH NATIONAL FILLING FACTORY.

The Georgetown factory, so named after Mr. Lloyd George, was situate ten miles from Glasgow and three miles from Paisley, and was served exclusively by the Caledonian Railway. It claimed to be a pioneer in the delicate operation of shell-filling; but it was launched on a big scale and everything connected with it—rail-transport included—assumed big proportions.

The first sod of the factory was cut on September 25th, 1915, and the first consignment of munitions was dispatched on March 13th, 1916; though it was about twenty months before everything was complete. The total area covered by the factory was 540 acres; and hereon there was raised, to constitute the factory proper, a varied collection of separate buildings, segregated in order to reduce the consequences of any possible explosion, and supplemented, not alone by offices and dining-rooms, with extensive catering arrangements, but, also, by a hospital, a church, and the inevitable picture-house. The construction of Georgetown necessitated the transport there, in the first instance, and mainly by the Caledonian Railway, of such items as 9,000,000 bricks, 1,500,000 cubic feet of timber, 9,500 tons of cement, 4,000 doors, 9,000 windows, 10 acres of glass, 76 acres of roofing felt, 10 miles of drain-pipes, 12 miles of water-pipes, 80 miles of heating pipes, 12 acres of linoleum, and five miles of barbed wire for the exclusion of undesirable visitors.

During the period when the factory had attained the maximum of its production, the number of workers employed was close on 15,000. Of these, about 14,000 were women or girls. The vast majority of them—a proportion which has been put at 95 per cent.—lived at Glasgow. The remainder had their homes at Paisley.

Between the date of the first consignment, as given above, and the end of December, 1918, the Georgetown factory filled 20,000,000 shells and cartridges of all calibres from the 18-pdr. to the 12-in.; 26,000,000 cartridges and 32,000,000 small components, besides engaging in a variety of other work concerned with mines, "Tanks," machine-gun shelters, locomotives and other such items. During the same period, also, the total output of explosives or other traffic from the factory, as handed to the Caledonian for conveyance by rail, was 459,000 tons. The greatest quantity of consignments dispatched in the course of any one day was on August 19th, 1918, when a record of 1,891 tons was attained.

These figures would be big enough if they stood alone; but they do not allow for the previous transport to the factory of an approximately equal weight of materials taken there for the production of the said output; they do not include the weight of the food-stuffs which, to a large extent, had to be conveyed to Georgetown by train for the supply of meals to the 10,000 or so of the workers for whom they were provided day by day, and still less do they include the passenger traffic represented by the running every day of 34 trains for the conveyance of those same 10,000 workers from home to factory and back again from factory to home—a return journey for the passengers (who thus counted as, in effect, 20,000 separate passengers), which meant a fourfold journey for all the engines and much of the rolling stock.

Beyond all this, the Caledonian undertook for the Government the maintenance of about eighteen miles of sidings laid in or adjoining the factory by the contractors, and they themselves put down and worked another four and a half miles of sidings. They built at Georgetown a passenger station with signal box, goods office and carriage-cleaning platforms, and they altered and extended the existing station and platforms at Houston as a further means of meeting the demands of the passenger traffic.

Yet, when everything in the way of transport in connection with this great National Factory has been allowed for, we have to bear in mind that, after all, Georgetown was but an incident in the sum total of the traffic demands pouring in from all directions upon the Caledonian Railway Company.

Gretna Explosives Factory.

The essential difference between Georgetown and Gretna, and the fundamental consideration from a railway-transport point of view—leaving aside any actual difference in the proportions of their respective output—lay in the fact that Georgetown was not much more than a huge workshop, whereas Gretna was an industrial city. Out of a maximum of 15,000 workers at Georgetown, the resident population was not more than 500—mainly caretakers. At Gretna the maximum attained in the number of workers at any one time was 20,000—and three-fourths of them had to live on the premises. For Georgetown there were great resources of female labour to be tapped in Glasgow, and the running of workwomen's (rather than workmen's) trains on the ten-mile journey, day by day, presented no insuperable difficulty to the Caledonian. For Gretna there was no Glasgow. Workers certainly did travel in large numbers daily from and to their homes in Carlisle, Annan, Dumfries, Lockerbie, Penrith, Langholm and Longtown ; but the labour resources of these places were quite unequal to such an occasion, and a large proportion of the sum total of workers required had to be gathered together from all parts of the Kingdom. When, too, they had been got, the bulk of them had to be housed, fed, cared for, entertained and looked after generally—at Gretna.

Here, therefore, we have the main reason why, while the Georgetown factory covered 540 acres, the area of the Gretna factory extended over nine miles.

The start with the building of the Gretna factory was made in September, 1915, and that step was taken because of the serious position into which the country was drifting in regard to cordite. It was felt that without an adequate supply of cordite we should assuredly lose the war. Our existing facilities for the production of that explosive were inadequate to requirements, and, although we were getting good quantities from the United States, we were paying for them a much higher price than it would cost to make them here, while there was the risk that the submarine danger might put a stop altogether to our overseas resources. So it was that the building of a great factory mainly for the making of cordite was resolved upon, and Gretna was chosen as the site for the reason, presumably, that an abundance of derelict land, constituting what has been described as " an unprofitable wilderness," on the edge of Solway shoals, was available there ; that Gretna would be safe from enemy aircraft, and, also, that there were excellent transport facilities available, Gretna being served by three railway companies.

Gretna Station is on the main line of the Caledonian Railway from Carlisle to Glasgow and Edinburgh. The Glasgow and South Western Company's system terminates at Gretna, but it joins up there with the Caledonian, over which the Glasgow and South Western have running powers between Gretna and Carlisle. Then from Gretna to Longtown there is a short branch railway, known as the Border Union Branch, which, owned by the North British Railway Company but taken over by the Ministry of Munitions on the Gretna factory being built, gave the North British access to Gretna from their main line between Carlisle and Edinburgh. Carlisle, again, is a great railway centre from which radiate, in addition to the three Scottish lines just mentioned, those of the London and North Western, the Midland, the North Eastern and the Maryport and Carlisle Railway Companies. Carlisle is, in fact, a junction which connects all parts of Scotland with all parts of England.

The building of the new city was in itself a great undertaking, not only for the builders but for the railways which had to carry most of the necessary materials for construction and equipment. The area allotted to the factory proper was 9,200 acres, included therein being a central zone in order that, in the interests of safety, certain processes of manufacture could be kept separate and distinct. The " townships " in which the workers were housed extended over 620 acres, and the remainder of the land occupied was devoted to the raising of crops for food supply. The factory, which included a power station capable of producing 10,500 kilowatts at 6,000 volts, was built on such a scale that it was equal to the production of a thousand tons of cordite per week, though much other war material, besides cordite, was also made.

Then, in the " townships," houses were provided for married people and hostels for single women and girls, of whom as many as 12,000 were at one time working in the factory. There was a central kitchen capable of providing meals for 14,000 people daily ; a bakery equal to 13,000 loaves daily, and a laundry that could wash 6,000 articles daily. The city was further supplied with a recreation hall, known as the Border Hall, consisting of three floors and accommodating 1,100 persons, and another hall which would hold 650. There were, still further, a number of churches ; a school for 800 or 900 children ; an institute with reading rooms and rooms for games ; a hospital ; a dental institute and two picture-houses, one seating 700 and the other 500. The provision of an adequate water supply from the river Esk, at a point five miles distant, involved the laying of, altogether, 100 miles of piping.

The first consignment of manufactured material from the Gretna factory was dispatched May 9th, 1916.

The total capital expenditure on building and equipment has been officially put at £9,184,000, and the cost of working the factory from September, 1916, to the end of September, 1918, at about £12,769,000—a total of £21,953,000.

Here, however, we are concerned less with questions of finance than with the magnitude of the traffic which, in the first instance, the building of the city and the provision of its machinery and equipment—apart from all the transport of raw materials and of manufactured goods that was to follow—threw upon the railways, and more especially the Caledonian. It would be too big a task to go into full details in respect to all these matters, and it may, perhaps, suffice to mention one single item—stone—as typical of the rest. During the period from September 10th, 1915, to July 4th, 1917, the quantity of stone conveyed by the Caledonian Railway from the Corsehill Quarry, Annan (taken over by the Ministry of Munitions), to the factory at Gretna, for road-making and other purposes, was 164,386 tons.

When, indeed, the factory was still under construction, it was found necessary to introduce special railway-wagon labels for the purpose of regulating the traffic. These labels, available for a certain period only, were supplied by the Government departments concerned to the consignors as occasion required and according to the traffic conditions at the receiving end. Consignments for Gretna were not accepted by the railways at the forwarding points unless they were accompanied by the labels in question.

Taking the entire volume of Caledonian traffic between England and Scotland which passed over the Carlisle-Gretna section of the company's main line, and leaving out of account the further traffic carried to or from Carlisle by the Glasgow and South Western over Caledonian lines by virtue of their running powers, the total for 1916 amounted to 2,813,692 tons, against 1,051,279 in 1913, an increase of 1,762,413 tons. This traffic consisted mainly of such commodities as stores of all kinds, fittings and equipment, steel and steel-work, guns of heavy calibre, pig-iron, iron ore, coal, munitions, and so on. All these things were, doubtless, for more or less urgent delivery; yet at certain hours of the day the goods and mineral traffic along the short stretch of line in question had to be greatly interrupted in order to allow of the running of workmen's trains.

Within the area of the factory there were 80 miles of railway track—40 miles of running lines and 40 miles of sidings. With the working of these interior lines the railway companies were not directly concerned; but the fact may be mentioned that the Government rolling stock used for this purpose comprised 38 locomotives, 87 passenger coaches, 95 cordite-paste vans, 54 cordite vans, and 375 open wagons. Seventeen platforms were constructed in the factory to serve the various compounds. Double-track lines were worked with Tyers' Double-track Block System and single-track lines with Tyers' Single-line Tablet system.

From the time the building of the factory was begun to the end of March, 1919, the total traffic carried in connection with it by the Caledonian was 529,957 tons, this, of course, being distinct from what was conveyed by the North British and the Glasgow and South Western Companies. The great expansion of the goods and mineral traffic from and to Gretna by the Caledonian route during the years from 1913 to 1918 inclusive can best be shown by the following table :—

YEAR.	GOODS.			MINERALS.			TOTAL OF GOODS AND MINERALS.
	Forwarded	Received.	Total.	Forwarded	Received.	Total.	
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1913 . .	911	687	1,598	399	913	1,312	2,910
1914 . .	738	648	1,386	276	1,958	2,234	3,620
1915 . .	819	23,366	24,185	1,649	39,670	41,319	65,504
1916 . .	9,748	76,158	85,906	65,960	176,585	242,545	328,451
1917 . .	24,133	68,994	93,127	17,612	64,153	81,765	174,892
1918 . .	14,030	47,471	61,501	1,640	22,921	24,561	86,062

Nor was the increase in the passenger traffic from and to Gretna by the Caledonian route less marked during the same period, as the following further figures will show :—

YEAR.	NUMBER OF PASSENGERS CARRIED.
1913	10,747
1914	8,653
1915	365,436
1916	1,842,822
1917	2,932,814
1918	1,348,637

This great increase is, of course, to be accounted for by the large number of workers employed at Gretna who lived in neighbouring towns and travelled to and fro each day, while each passenger making a return journey is counted as equal to two passengers for a single journey.

With Georgetown wholly, and Gretna in large measure, on their hands, the Caledonian Railway Company would appear to have already an abundance of war-work of which to acquit themselves ; but there was much more besides.

OTHER FACTORIES.

Of Government factories on the Caledonian system apart from Georgetown and Gretna, and engaged principally in the manufacture of shells, there were sixteen. In addition to these there were, approximately, seventy factories which, though not staffed by the Government, were under Government control, and were either set up or extended during the war for the production of shell, aeroplanes (complete), aircraft material, Army rations, ammunition boxes, engines, gun mountings, canvas, cloth, sand-bags, etc.

A few facts concerning one or two of the more important of these factories may help to indicate still more clearly the sort of work that was being done in Scotland and the nature and extent of the traffic for which such provision as was possible had to be made.

There was, for instance, the National Projectile Factory in David Street, Mile End, Glasgow. This was opened in an old cotton mill acquired by the Ministry of Munitions in September, 1915, and the number of hands eventually employed attained a total of 3,000—2,000 women and girls and 1,000 men. Up to the time of the Armistice there had been dispatched from this converted cotton mill over 2,000,000 shells (including 6-in., 60-pdrs., and 18-pdrs.).

A factory at Cardonald, Glasgow, completed about January, 1916, was among those managed by Messrs. William Beardmore and Company, Ltd., on behalf of the Government. Between 4,000 and 5,000 hands, mostly girls, were engaged there in the turning and finishing of 6-in. and 8-in. shells for the various filling factories. The factory was served by two railway systems. The bulk of the traffic by the Caledonian route consisted of turnings and cuttings, and the quantities so consigned up to the end of December, 1918, amounted to 72,000 tons.

Mention of the works of Messrs. G. and J. Weir, Ltd., Cathcart (Glasgow), should not be omitted. The principal products there, prior to the war, were ships' pumps and pumping machinery. When the war came, Messrs. Weir greatly extended their works, built new factories, and engaged in the manufacture of shell and aeroplanes. Before Armistice Day they had finished 900 complete aeroplanes and 40,000 engine parts, in addition to their output of shell. Practically the whole of the traffic was railed from the Caledonian Company's Cathcart Station, adjacent to the works.

Messrs. Arrol-Johnston, Ltd., Heath Hall, Locharbriggs, Dumfries, makers of motor-cars in the days before the war, also engaged in the manufacture of aeroplane engines and aeroplane parts. The number of workers they employed attained a maximum of 2,300, while the production during the war-period included 2,500 aeroplane engines, 900 sets of aeroplane wings, 10 aeroplanes, and 7,000 gun-mountings.

These examples are typical of what went on, more or less, in practically the whole of the seventy factories in question.

Aeroplane Depots.

Large aerodromes were situated on the Caledonian system at Montrose, Renfrew and Edzell.

The Montrose aerodrome, constructed prior to the war, was used as a training ground and, later on, as a distributing centre. Between August 4th, 1914, and December 31st, 1918, the amount of Government traffic carried by the Caledonian to or from Montrose Station was, approximately, 12,000 tons.

For the construction of the Inchinnan Aerodrome, Renfrew, 9,000 tons of material were dealt with at the Caledonian Company's Paisley (St. James') Station. Large quantities of stores also passed through the Company's Houston Station, the traffic handled there during 1918 in connection with the aerodrome amounting to about 5,000 tons. It was at Renfrew that "R 34," the first dirigible to cross the Atlantic, was built.

Some 26,000 tons of building material, etc., were conveyed for the construction of the aerodrome at Edzell.

For the seaplane base at Dundee the company carried about 5,000 tons of building materials, etc., supplemented, during 1918, by 1,500 tons of stores.

MILITARY CAMPS.

In addition to the barracks in Glasgow, Edinburgh, Aberdeen and other large towns, various military camps were served by the Caledonian.

Over 100,000 tons of building material were carried in connection with the construction of Redford Barracks and Dreghorn and Malleny Camps, (in the Edinburgh district), though about 25,000 tons of this quantity were carried, for the Redford Barracks, prior to August, 1914. During 1918 the quantity of equipment, stores, etc., conveyed by goods train to these destinations was about 1,000 tons.

At Cornton, Bridge of Allan, there was a remount camp to which many thousands of horses were sent by special train from various parts of the country, being afterwards redistributed in the same way. For the setting up of this camp the company carried building materials to the extent of 6,000 tons. Equipment, stores, etc., for the camp during 1918 gave 2,000 tons of traffic.

Other camps on the Caledonian system included those at Barry and Buddon (Dundee district), Blairgowrie, Forfar and Stirling.

TIMBER TRAFFIC.

During the course of the war, six timber camps were opened at or near to stations on the Caledonian system, namely, three by the Canadian Forestry Corps, at Floriston, Methven and Stanley, and three by the Forestry Department of the Board of Trade, at Kirriemuir, Maryfield (Dundee) and Stobo. The tonnage of timber traffic forwarded from places on the Caledonian Railway during the years 1913, 1917 and 1918 respectively was as follows :—

1913. Tons.	1917. Tons.	1918. Tons.
252,437	385,511	407,254

Of the 407,254 tons carried during 1918, 306,650 tons consisted of home-grown timber ; but no comparison can be made with a corresponding figure for the pre-war period, as no distinction was then made between home-grown and imported timber.

POTATO TRAFFIC.

A great expansion occurred in the conveyance of potatoes over the railway owing to a combination of causes, and notably the lack of shipping, the divergence of traffic from sea to rail on account of the submarine danger, and the imperative need for increased production in the interests of the national food supply—a need felt to be so great in the spring of 1918 that seed potatoes and seed grain from Scotland were given priority over all descriptions of other traffic, including Government stores.

The effect of these conditions on the Caledonian was that the quantity of potatoes carried from stations on that system during the season ending May, 1918, was 150,298 tons, as compared with 50,414 tons during the same period in the previous year—an increase of 99,884 tons, equal to 198 per cent.

GOODS AND MINERAL TRAFFIC TOTALS.

The following table shows the amount of goods and mineral traffic, including Government traffic, arising or terminating at stations on the Caledonian system in the years 1913 and 1918 respectively. It also includes " through-through " traffic (not originating or terminating on the Caledonian system), when " carried in Caledonian trains "—that is to say, in trains hauled by Caledonian engines ; but it does not include traffic worked over the system by other companies in the exercise of running powers, so that the sum total of the traffic passing over Caledonian lines was even greater than the figures given in the table would suggest :—

	1913. Tons.	1918. Tons.	INCREASE. Tons.
Goods	4,986,341	7,099,655	2,113,314
Minerals	18,989,129	19,181,990	192,861
Total	23,975,470	26,281,645	2,306,175

TRAFFIC REQUIRING SPECIAL VEHICLES.

Inasmuch as nearly the whole of the large iron, steel and engineering works in Scotland are either directly connected with the Caledonian Railway system or else within convenient reach thereof, the company were, on the outbreak of war, already well provided with vehicles of the special types normally used for the conveyance of manufactures of exceptional size or weight, as, for example, boilers, ingots, ships' propellers, stern frames, plates, machinery, etc., and these vehicles were now found especially suitable for the conveyance of such war material as guns, " Tanks " and aeroplanes.

During the period from August 4th, 1914, to June 17th, 1916, the Caledonian Company carried over their lines eighty-four heavy guns, weighing from 50 tons to 100 tons each. These were all carried on the company's own gun-sets. Between May 4th, 1918, and the signing of the Armistice, fifteen guns, each weighing from 70 to 100 tons, were conveyed by the Caledonian Company on a new 165-ton gun-set built on Government account by Messrs. Hurst, Nelson and Company, Ltd., of Motherwell.

The Caledonian Company also carried on their own special-class wagons and on wagons of a similar type borrowed from other companies 220 "tanks" for shipment to France, and over 1,800 complete aeroplanes forwarded from various points on the system.

In addition to the extra trouble occasioned by the work of loading these exceptional traffics and in making the special arrangements they occasioned, over-gauge loads led, in some instances, to a serious retarding of other traffic owing to the need, it might be, to keep the adjoining line clear in order that the said loads might pass in safety.

PASSENGER-TRAIN TRAFFIC.

In dealing with the volume of passenger traffic, allowance must be made for, among other items, that which passed to and from the various camps set up on the Caledonian system and, also, for the substantial proportions of that in connection with numerous works and factories, whether expanded or specially created.

The total number of passengers carried in Caledonian trains (apart from those conveyed in other companies' trains) on the Caledonian Railway in 1918 as compared with 1913 was as follows :—

YEAR.	NUMBER.
1918	75,634,391
1913	68,017,251
Increase	7,617,140

The figures for 1918 include naval and military passengers carried free. The number of these, from the outbreak of the war to the end of 1918, was :—

August 5th, 1914, to December, 1914	359,719
Year 1915	909,598
„ 1916	575,204
„ 1917	693,918
„ 1918	739,539
Total	3,277,978

The number of parcels under 2 cwt. and the weight of other merchandise traffic by passenger train in 1918 and 1913, may be shown thus :—

YEAR.	NUMBER OF PARCELS UNDER 2 CWT.		WEIGHT OF OTHER TRAFFIC. Tons.
1918	4,233,353		83,782
1913	4,959,474		54,097
Decrease	726,121	Increase	29,685

The increase in weight, as against the decrease in number, is to be accounted for by the fact that, with a view to securing earlier delivery of urgent consignments, the naval and military authorities sent considerable quantities of munitions, machinery, ship-material, etc., by passenger train instead of forwarding by goods train.

New Works.

Notwithstanding the shortage in staff and material, much was done in the way of providing sidings, etc., in order to meet the requirements of Government departments and commercial firms on account of the abnormal traffic requirements to which the war gave rise.

The total number of new sidings thus constructed on different parts of the Caledonian system by the company's engineering staff, as distinct from what was done in the same direction by Government contractors, amounted to sixty-one miles. This figure includes the four and a quarter miles of sidings laid at the Georgetown factory. It also includes siding accommodation in connection with military camps, with oil-fuel, engine-shed and mine-storage sidings for the Admiralty at Grangemouth, together with various sidings for the War Department and the Ordnance Department as well as for many different factories and works, those, for instance, in connection with the Lanarkshire Steel Works at Flemington having a length of six and three-quarter miles.

In addition to the foregoing, the Caledonian Company constructed, on their own account, at Perth North, exchange sidings capable of storing 144 wagons in order to relieve the congestion to which that section of the line was liable.

Two new platforms, each 700 feet long, were put up at Mossband for the use of workmen employed at Gretna Explosives Factory, who travelled daily in special workers' trains from and to Penrith, Carlisle, Lockerbie, etc.

At Glasgow Central Station certain of the waiting rooms were altered to make provision for a canteen for the use of soldiers and sailors. Another was converted into a Red Cross ambulance room. A new platform and awning were provided at Gateside, near Cambuslang, for the detraining of wounded soldiers who were being conveyed to the hospital there.

North of Carlisle, a widening of the line between Rockcliffe and Floriston was carried out for a length of 3 miles 68 chains in order to facilitate the traffic between Carlisle and Gretna. Then, also, a new signal cabin was constructed at Rockcliffe, while at Floriston the goods yard was remodelled and extended, and accommodation was provided for dealing with timber traffic.

Huts for the use of military guards were erected at four viaducts on the Caledonian system, and in one instance, that of the Garnock viaduct at Kilwinning, on the Lanarkshire and Ayrshire Railway, the hut was supplemented by a footbridge erected over the river Garnock.

Steamships.

The entire fleet of steamers with which the Caledonian Steam Packet Company, Ltd.—operating in connection with the Caledonian Railway Company—maintained services between Gourock, Wemyss Bay and Ardrossan and the watering places on the Firth of Clyde, together with the islands of Bute and Arran, was requisitioned by the Government for the purposes of the war.

The *Duchess of Argyll* (a turbine steamer, length 250 feet, breadth 30 feet, gross tonnage 740, indicated h.p. 3,600, speed 21¾ knots, passenger capacity 1,713) was employed in conveying troops from the South of England to France. While engaged on this work she was called to the rescue of two troopships.

The first occasion was on September 15th, 1915, when, while lying off Boulogne, at 12.15 a.m., she was ordered to go to the assistance of H.M.T. *Queen Empress*, which, with 1,000 troops on board, had been in collision with a destroyer. At 1.30 a.m. she took the troopship in tow until several tugs arrived on the scene, and she then stood by until all danger was past. Then, on February 1st, 1918, while the *Duchess of Argyll* was lying at Havre, the master received orders, at 4.40 a.m., to proceed to the assistance of the *Archangel*, which had 1,600 troops on board, had been run into by a British destroyer, and was then sinking. The *Argyll* was alongside at 5.30 a.m. ; she took off all the troops, and she returned with them to Havre by 6.35 a.m.—a truly notable achievement.

During the four years the *Argyll* acted as a troopship she sailed continuously and did not have a single mishap.

The other vessels in the company's fleet, *Duchess of Hamilton, Duchess of Fife, Duchess of Rothesay, Duchess of Montrose, Marchioness of Lorne, Marchioness of Breadalbane,* and *Caledonia* were requisitioned for mine-sweeping. They did excellent work, but two of them were lost, the *Duchess of Hamilton* on November 29th, 1915, and the *Duchess of Montrose* on March 18th, 1917. The others afterwards returned to the Clyde.

Railway Equipment Supplied.

The Caledonian provided 309 wagons for dispatch overseas, and they also handed over 231 wagons to other railway companies who had sent overseas a greater number in proportion to their stock. Sixteen modern vehicles were converted into an ambulance train, and six 6-wheeled brake-third carriages, together with twenty 6-wheeled ordinary carriages, were provided for the use of the British Armies in France.

Six of the company's 2-ton hydraulic cranes in Grange Dock, Grangemouth, were dismantled and sent to Rouen in March, 1917. The work of dismantling and of reconstruction in France was done by the company's hydraulic foreman, who, at the beginning of 1919, was sent again to France to dismantle the cranes for their return to Grangemouth.

Of permanent-way materials sufficient for about 12 miles of single line of railway were lifted from various parts of the Caledonian system during the war and sent to France.

The company further supplied four trolley-wagons which were used in making up the two armoured trains stationed on the East Coast of England and Scotland respectively as a precautionary measure in case of an attempted landing by the enemy.

Manufacture of Munitions of War.

Work done by the company in their locomotive or carriage workshops for the War Office, the Ministry of Munitions and Woolwich Arsenal included the supply of the following articles :—Ammunition : Gaines, 41,640 ; gaine fuzes, 4,215. Guns, gun-carriages and equipment : Mountings for 8-in. howitzers, 23 sets ; brake work for 6-in. gun-carriages, 8 sets ; fixing screws, 40 ; brake blocks, 20. Transport : General service wagons (Artillery section), 274 ; water-tank carts, 25. Miscellaneous : Picketing posts, 500 ; picketing pegs, 8,000.

Other work, done by the company to assist Scottish firms under contract with the Government, included the following :—18-pounders : Extractors, Ordnance Q.F., 71 ; Field equipment forgings machined, 50 ; levers, breech mechanism machined and finished, 161. Submarine mines, 1,370.

Ambulance Trains and Ambulance Work.

Of loaded military-ambulance trains run on the Caledonian system between August, 1914, and November, 1918, the total number was 962. Of these 763 came from Southampton and 199 from Dover. The destinations of the 962 were—Glasgow, 522 ; Edinburgh, 97 ; Perth, 73 ; Dundee, 86 ; and Aberdeen, 184. The empty carriages were invariably returned to the starting point.

Of ambulance trains for the Royal Navy dealt with at Caledonian stations during the continuance of hostilities the number was 630, namely, Edinburgh, 135 ; Perth, 174 ; Wemyss Bay, 80 ; Strathaven, 41 ; Larbert, 97 ; Dawsholm, 98 ; and Peebles, 5.

Assistance in the transport of wounded from trains to hospital was rendered by squads from the Caledonian Railway Ambulance Brigade at a number of stations. At places where the transport work was undertaken by the Red Cross Society Caledonian men joined that body and assisted as required. Several members of the Brigade also acted as orderlies in military hospitals in their own time.

When the St. Andrew's Ambulance Association organised squads for emergency use in the event of enemy air raids, the various ambulance sections on the Caledonian Railway submitted the names of members willing to help when called upon. Lists were kept in the various district police offices so that those whose names were thereon could be called out at the shortest notice whenever a raid might occur.

A large number of Caledonian ambulance men served in the Royal

Army Medical Corps both at home and abroad. Some of them joined the first foreign service units organised by the St. Andrew's Ambulance Association in October, 1914.

ENLISTMENTS.

The number of Caledonian Railway men who had been released to join H.M. Forces down to November, 1918, was 5,229, or 21·9 of the total staff on August 4th, 1914.

EMPLOYMENT OF WOMEN AND GIRLS.

The number of women and girls employed on the Caledonian Railway prior to the war was eighty. Most of them were carriage cleaners. During the course of the war this number was increased to 1,911, namely, Superintendent of the Line's Department, 1,105; Goods Department, 455; Locomotive Department, 232; Engineering Department, 119. Nearly the whole of these—in fact the whole of those in the three last-mentioned departments—took the places of men who had left to join the Forces. Of the total taken on, 387 were clerks and typists. Among the remainder there were 281 booking and parcels clerks, 239 passenger-porters, 106 ticket-collectors, 89 parcel and left-luggage porters, 21 guards, 16 porter-guards, 204 carriage-cleaners, 16 signalwomen, 20 porter signalwomen, 120 labourers in the engineering workshops, 24 machine workers, drillers, screwers and turners, 10 wagon painters, 8 engine coalers, and 4 engine-tube cleaners.

ALLOTMENTS.

During the war a special effort was made to induce the company's servants to cultivate plots of land within the fences both of the railway lines and of the Forth and Clyde Canal. Facilities in the same direction were also extended to non-railway men. As the result of these efforts, land was brought under cultivation as follows:—

	PLOTS.	ACRES.
By company's servants	3,869	200
By the public	452	30
Total	4,321	230

GRANGEMOUTH DOCKS.

An account of the war-work done in Grangemouth Docks, owned by the Caledonian Railway Company, will be found in Chapter XXXIX.

CHAPTER LIX.

GLASGOW AND SOUTH WESTERN RAILWAY.

In its full extent of 500 miles, the system of the Glasgow and South Western Railway serves a number of important towns and industrial districts situate between Glasgow and Largs, on the north, and Carlisle and Stranraer, on the south, included in this area being the rich and highly agricultural counties of Ayrshire, Dumfriesshire, Kirkcudbrightshire and the Galloway district so closely associated with the works of Crockett and other writers. The company are owners of the piers at Renfrew, Largs and Fairlie, together with the harbours of Troon and Ayr ; they are part owners of the Girvan and Stranraer harbours ; they have carried on important steamship services on the Firth of Clyde, including those to the Islands of Arran and Bute and various points along the west coast of Scotland, whilst their system as a whole is an important link in the communications between England and central and northern Scotland in general.

A railway thus situated was bound to be called upon to render services of many different kinds and on a considerable scale for the purposes of the war, and the story of the company's accomplished results compares not unfavourably with those attained even by companies possessing greater mileage and more extensive resources.

Military Traffic.

The number of special military trains run on the company's system from the outbreak of the war to December 31st, 1918, was 1,116, and there were conveyed by them 7,444 officers, 144,066 men, 31,025 horses, 475 vans of stores and baggage, 310 military vehicles, 3,337 cycles, and 134 motors. As for the large number of naval and military passengers carried by ordinary train, there are no figures available to show the sum total of these. The majority of them travelled on free warrants, of which the company had no means of obtaining a record.

Ambulance Trains.

Of ambulance trains from England, a total of forty, conveying 4,937 patients, were run during the war period to destinations on the Glasgow and South Western system. The work of unloading these trains was done by the medical staff travelling with them, aided by members of local Voluntary Aid Detachments.

PASSENGER TRAFFIC.

Greatly increased numbers of workpeople were carried in proportion as more and still more factories for the production of munitions and other military or naval requirements were opened in many different parts of the company's system. A maximum of twenty trains per day was set aside in the case of the Gretna Factory for the conveyance of workers thereat from and to Dumfries, Annan and Carlisle.

The following table, showing the passenger-train traffic carried between the years 1913–1918 inclusive, gives evidence of good increases notwithstanding the aforesaid absence of statistics as to the naval and military traffic carried on vouchers:—

YEAR.	1ST CLASS.	3RD CLASS.	WORKMEN'S TICKETS.	TOTAL.
1913 . . .	386,705	10,885,688	4,224,385	15,496,778
1914 . . .	347,260	10,465,186	4,441,677	15,254,123
1915 . . .	336,354	9,778,654	6,019,848	16,134,856
1916 . . .	398,598	10,237,741	9,578,027	20,214,366
1917 . . .	287,784	7,645,887	10,352,016	18,285,687
1918 . . .	384,076	8,610,536	9,072,133	18,066,745

GOODS TRAFFIC.

For the company's Traffic Department it became a matter of great concern from the very outbreak of the war as to how, under a great variety of ever-changing conditions, they could best handle the great volumes of traffic which, in one form or another, were to be regarded as constituting munitions of war. This traffic comprised guns, explosives, ammunition, machinery, horses, mules, fuel and all kinds of food stuffs. In fact, during the last two years of the war the great bulk of the goods and mineral traffic on the Glasgow and South Western consisted—apart from food supplies—either of munitions of war of one kind or another or of raw material for their manufacture.

The utilisation by the Admiralty of various ports on the company's system led to large quantities of coal having to be worked to those points from the South Wales collieries, the quantities so carried by rail becoming greater still as the shortage of vessels for sea transport grew more acute. It was under these conditions that from the outbreak of the war to December 31st, 1918, the company carried over their lines 60,000 wagons of Welsh coal, exchanged from English companies at Carlisle, to which point the empty wagons had to be returned *en route* for the collieries from which they had come.

The diversion of shipping from the East to the West Coast ports, and, also, the adoption of the "convoy" system, led to the company having in many instances to undertake the haulage of traffic for longer distances than before. This was especially the case in regard to cargoes of iron ore. Prior to the outbreak of hostilities, iron ore from overseas was, as a rule, discharged at a port convenient to the particular works for which it was destined; but, as the result of the shipping difficulties, coupled with the general shortage in supplies, each cargo was divided up among a number of works some of which might be at a considerable distance from the port where the ore had been discharged.

Although not serving a territory wooded to any particular degree and comparable—in this respect—to the districts of other Scottish railway companies further to the north, the Glasgow and South Western was, nevertheless, concerned in the greater transport of home-grown timber due to the check on imports, the company having to convey a total of over 336,000 tons of timber which had been cut down in the vicinity of their stations.

As regards munition traffic, the only factory on the Glasgow and South Western system at which explosives were manufactured prior to the war was that of Messrs. Nobel, at Ardeer (Ayrshire). In proportion as the need of the military situation increased, new works for the making of war material were started at many places on or near the line, and there were few of any consequence among works established prior to the war which did not devote themselves mainly, if not exclusively, to the production of one kind or another of war material. Engine shops, for example, naturally took to the production of the much-needed shells or to the manufacture of machinery for making war material; carpet factories diverted their production to that of army blankets; shipbuilding firms, engineering firms and iron companies made extensive additions to their yards, works or factories in order that their facilities for production might be increased, and so on with many other concerns.

The establishments which thus helped to pour great volumes of traffic on to the Glasgow and South Western lines included the National Projectile Factory, Cardonald (shells); the National Filling Factory, Cardonald; the National Projectile Factory, Renfrew; the Shrapnel Factory, Renfrew; H.M. Factory, Irvine; the Standard Chemical Works, Irvine; the Misk Factory, Ardeer, Stevenston (ammunition); the Aerial School of Gunnery, Loch Doon, Dalmellington; the Aerial School of Gunnery, Turnberry; and H.M. Factory, Gretna. Of these various establishments the greatest of all was the last-mentioned, and the Glasgow and South Western shared with the two other leading Scottish railway companies in carrying the prodigious quantities of traffic to which the setting up of the factory led. During the period when the factory was under construction, the Glasgow and South Western alone took there as many as 400 wagons of materials on a single day. When, also, the factory had started on the work of production, the same company dealt with up to 100 loaded wagons in a day, and this notwithstanding the fact that the company's route was made use of by the factory for the conveyance of certain by-products only. The factory at Irvine and the Misk Factory at Ardeer both produced explosives on a substantial scale and were important contributors to the G. & S.W. traffic.

Mention should also be made of the large training camps established at Gailes and Irvine; the salvage dump at Renfrew, and the magazines for the storage of explosives at Perceton (Dreghorn) and Dalricket (New Cumnock). Special traffic arrangements had to be made by the company in connection with the last-mentioned.

Altogether, the tonnage for Government Departments on which no carriage charges were raised by the company, or, if raised, were subsequently cleared, in the last three years of the war, were: 1916, 189,581 tons; 1917, 770,034 tons; 1918, 776,821 tons. During the same three years the company carried 17,000 horses for the War Office and 20,000 head of cattle and 79,000 sheep in connection with the control exercised by the Ministry of Food. For this traffic, also, no carriage charges were raised.

In the experience of the Glasgow and South Western, the system of control instituted for the Carlisle area on January 3rd, 1916, with a view to avoiding delay to goods trains and dealing more expeditiously with the greatly increased traffic passing between Scotland and England, was very satisfactory from a traffic-working point of view.

The Glasgow and South Western gained further advantage from the system of allocating to one company traffic passing by different routes between common points, the object being to economise conveyance and make the best use of the facilities available. For the same reason they adopted at a number of places the plan of accepting only on specified days goods that were consigned in less than full wagon loads for certain destinations.

New Works.

The increased production at existing factories; the construction of so many new industrial establishments; the great expansion of traffic and the need for meeting war-time conditions, in general, all combined to render necessary a wide range of new works by the Engineering Department as a means of ensuring the provision of increased transport facilities. Widenings of main lines were carried out at different points; loop sidings and marshalling sidings were provided, and a number of additional sidings either for storing wagons or for the accommodation of general traffic were put in. These included a siding 395 yards in length at Carlisle; two, 535 yards in length, at Ayr; five sidings, to hold 200 wagons, at Barony Junction, near Auchinleck; additional marshalling sidings, to accommodate a further 320 wagons, at Falkland Junction, Ayr; nine new sidings at Ayr Harbour, to hold 177 wagons, and so on at other places besides. Then, at different points on the system, extra office accommodation had to be provided; platforms and goods sheds were extended; new goods sheds and engine sheds were built, and electric hoists were substituted for hydraulic hoists. The sidings provided by the company to facilitate traffic to and from the Gretna Factory were on an especially extensive scale. At Gretna Green station the total length of rails laid by the company, for various purposes, was about 3,400 yards; at Dornock station, where the principal connection of the G. & S.W. to the factory was formed, the total length of lines laid by the company, either for goods traffic or for the accommodation of the large workmen's-train traffic, was about 6,200 lineal yards. Branch lines, sidings, platforms for workmen's trains, junctions with main lines, and other works were, also, carried out or provided in connection with a number of other establishments belonging to or engaged on work for the Government.

Material Supplied.

The material supplied to the Government by the Glasgow and South Western for constructional purposes included everything necessary for the laying of five miles of single track ; 15,000 new sleepers, 100 sets of switches, and 100 crossings.

Steamships and Harbours.

The number of steamships owned by the company at the outbreak of war was nine, and the whole of these were taken over by the Government either for the conveyance of troops or for use as mine-sweepers. Two of them were lost. By charter or otherwise, the company were able to maintain their services between Ardrossan and the Island of Arran, and also between Greenock, Gourock, Dunoon and Holy Loch ports. Among other advantages thus afforded was that of assisting to maintain the food supplies of the country.

Troon Harbour (which, as already stated, is the property of the Glasgow and South Western Company) was taken over by the Government for the duration of the war. It was used by them mainly as a base for mine-sweepers. Covering an area of about forty acres, the harbour is close to an important mining district, is well fitted up with modern appliances for loading and discharging cargoes, and has connected with it a large shipyard, some engineering works, and two dry docks.

Enlistments.

The number of men employed by the company at the outset of the war was 9,804. Of these, 2,410, or 24·58 per cent. of the total, had joined H.M. Forces down to November 10th, 1918. The number of those who gave up their lives for their country was 296.

Women and Girls Employed.

Prior to the outbreak of the war, the company were already employing 199 women and girls. With the departure of so considerable a proportion of the male staff on active service, there was a greater resort to feminine helpers, a maximum in the number of women and girls taken on being reached in November, 1918, when there were 571 occupied on clerical duties and 711 on the wages staff—a total of 1,282 altogether. This number, however, was steadily reduced in proportion as the men returned from the Army and Navy to their railway duties.

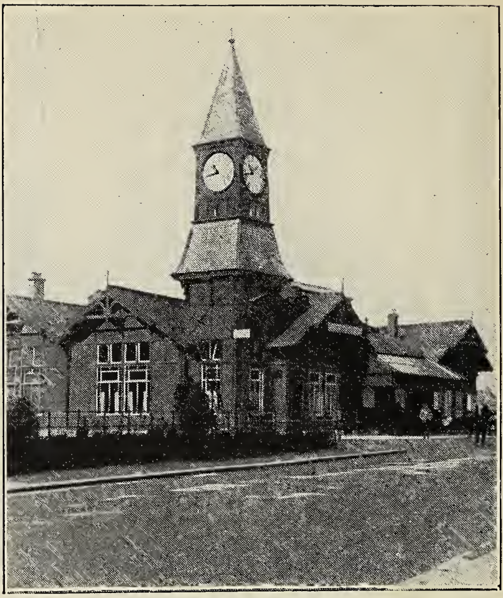
ALLOTMENTS.

As the result of efforts made by the company to encourage the development of allotments, in the interests of the maintenance of food supplies, over 700 applications were received for plots of ground adjacent to the railway. An allotment was arranged for in each and every instance, with the result that nearly 30 acres of previously uncultivated strips of land, here and there, belonging to the company were devoted to the production of potatoes and vegetables.

JULY 1923

The Callander and Oban Railway.

By J. F. GAIRNS.



OBAN STATION.

RANKING with the Perth-Inverness line of the late Highland Railway, and the West Highland section of the late North British Railway, the Callander and Oban Railway, with the Ballachulish Extension, constitutes the third of the three great Scottish mountain lines, in each case a hundred miles, or nearly so, virtually continuously amidst mountain surroundings vying for scenic interest, if not in regard to the heights of the adjacent peaks, with those of the famous mountain lines in other lands. This line has on several occasions received attention in the pages of the RAILWAY MAGAZINE, notably in the issues of September, 1903, August, 1904, and August and September, 1912. It will, therefore, be sufficient to deal with it on the basis of a journey through from Stirling to Oban and to Ballachulish. In introduction, however, the principal historical facts may be briefly reviewed.

The Callander and Oban Railway Company was constituted in 1865. The Dunblane, Doune and Callander Railway was already in existence, having been opened in 1858. The Callander and Oban line was opened: Callander to Killin Junction, 1870; Killin Junction to Tyndrum, August, 1873, thence to Dalmally, May, 1877; and to Oban, July, 1880. At Balquhidder, at first known as Lochearnhead, the line from Crieff makes connection. This route, with connecting lines, was opened, Perth to Methven, 1838; Methven Junction to Crieff, 1866; Gleneagles (previously Crieff Junction) to Crieff, 1856; Crieff to Comrie, 1893; Comrie to St. Fillans, 1901; St. Fillans to Balquhidder (Lochearnhead), 1905. The Callander and Oban line has always been worked by the Caledonian Company, and is now included in the London Midland and Scottish Railway.

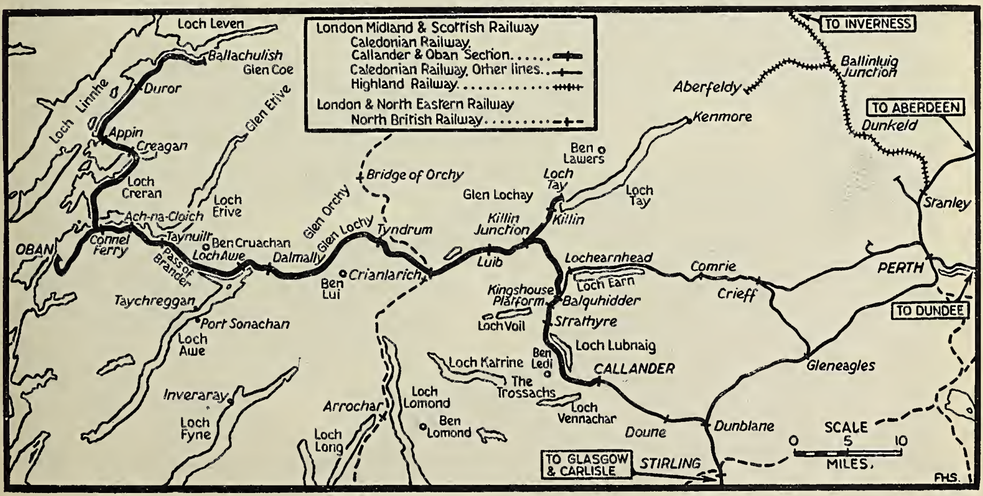
Dunblane is the ordinary junction for the Callander and Oban line, but trains which are not through to or from Glasgow use Stirling as their southern terminus. In some instances, ordinary Caledonian main line engines work the trains to and from Callander, the special C. and O. engines being attached or detached there, though this is mainly a traffic arrangement, convenient in the case of certain trains. At Dunblane there is an island platform on the down side, thus enabling branch trains to wait on the outer side to make connections. To Doune is double track, and the country mainly pastoral. Thence to Callander is single line, controlled by electric train tablet, as is the whole of the Callander and Oban line. The scenery continues to be of lowland character, though picturesque, but signs of the mountain country beyond show themselves. Between Doune and Callander is an intermediate crossing place—Drumvaich Crossing—to break up the long section of nearly 7 miles between stations. The original line diverged into what is now the goods station at Callander, the present station having been built when the Oban line was made. Callander station is distinctly picturesque, an ornamental clock tower surmounting the footbridge, and the station buildings being neat and attractive, while the platforms are decorated florally. It also has refreshment rooms on the platforms. On the up and down sides there are short bay lines from which locals can start as required. For down trains there is also a ticket platform, half a mile or so short of the station, but this is now used only by a few trains.

Crossing the River Leny by a bowstring girder bridge, mountain country is entered in the Pass of Leny, and Ben Ledi and Ben Vane on the one side (the former skirted by the line), Ben Each, and, in the distance, Ben Vorlich, on the other, give evidence of the nature of the country traversed. The Falls of Leny can be seen on the right providing the intervening foliage is not too full. "St. Bride's Crossing," at the head of the Pass of Leny, is now only used as a crossing place at periods of special pressure. For nearly two miles the line then proceeds along the western shore, and almost at the water's edge, of Loch Lubnaig—"the crooked lake." A short distance beyond St. Bride's Crossing is Craignacailleach Platform, used by children of railway servants going to school in Callander by the 5.40 a.m. from Oban and the 6.45 p.m. from Callander, daily except Saturdays. At the picturesque little station of Strathyre, both platforms are adorned by ornamental shrubs, and on the up side there is a fountain, rockeries, rustic gateways, &c., lending further interest to this pretty station among its beautiful natural surroundings.

Before reaching Strathyre station the River Balvag is crossed. It keeps close company with the railway until near Kingshouse Platform, where a glimpse is had of the hills encircling Loch Voil. Kingshouse Platform is used as a halt, trains calling as required, for the convenience of visitors to the Braes o' Balquhidder.

Balquhidder station, at first known as Lochearnhead, is the junction for the line to Crieff, Gleneagles and Perth. The branch comes in from the north, paralleled by the Oban line for some distance, from the head of the Loch Earn. Balquhidder station has an island platform on the up side to provide for trains in connection.

Leaving Balquhidder the Oban line climbs steeply along the hillside as it finds its way up Glen Ogle, overlooking in the ascent the Crieff line as it follows the shores of Loch Earn eastward, and giving views over the waters of the Loch, amidst their mountain setting,



MAP OF CALLANDER AND OBAN RAILWAY AND LINES IN CONNECTION.

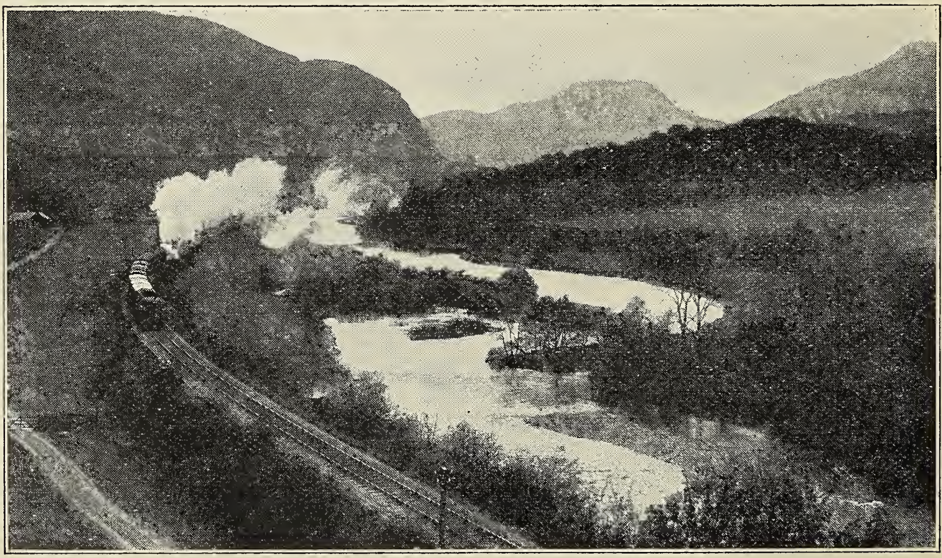
which are said to be the finest in the British Isles. On the occasion of the writer's tour of this line, having travelled by the night train from London, the scene presented at this point, with the rising sun glowing over the expanse of Loch Earn opened out, was one which, once seen, could hardly be forgotten, associated as it was with " running " mist clouds in all directions on the mountain sides as the dawn gave place to day.

Nearly 8 miles separate Balquhidder and Killin Junction stations, though there is an intermediate crossing—Glenoglehead. This was the site of the original Killin station, before the opening of the Killin Branch Railway. The whole length of " gloomy " Glen Ogle—a wild rocky valley, four miles in length, described as the Khyber Pass of Scotland—is traversed, with its rocky boulder-strewn slopes, the railway being carried in places on brick or masonry viaducts around the face of the rock where the cutting of a ledge was well-nigh impossible. For most of the ascent the view from the train is down almost precipitous slopes, continued upwards on the other side.

At the northern end of the Pass the line curves westward, overlooking the Loch Tay branch which runs from Killin Junction to the little town of Killin, with an extension of about a mile to a pier on Loch Tay to connect with the railway steamers which serve the whole length of the Loch, glimpses of which are had from the Oban train. The branch is on a lower level and its track can be seen for a long distance from the main line. The branch railway is one of very heavy gradients. At Killin Junction it makes connection with the main line which has descended from Glenoglehead to meet it. The station here has the usual island platform on the up side, to accommodate the branch trains clear of the main line.

Continuing westward past Luib to Crianlarich, Glen Dochart is traversed, with the River Dochart, until it merges into Loch Iubhair, succeeded in turn by Loch Dochart, and the public road, for company close alongside. Here splendid views are had on both sides, bare mountain slopes being relieved by wooded areas, while rushing burns and streamlets add further interest. On both sides are peaks of considerable height, notably Ben Dheiceach (3,074 ft.) to the north, Ben More (3,843 ft.) immediately ahead, and Stobinian (3,821 ft.) to the south, with many others in the distance.

Crianlarich is important as it provides for interchange traffic with the West Highland line to Fort William and Mallaig, which here crosses. The stations are within a short distance, and there is siding connection for interchange goods traffic. The Callander and Oban station is a neat



IN THE PASS OF LENY.

LOCHEARNHEAD VIADUCT, CRIEFF AND BALQUHIDDER LINE.

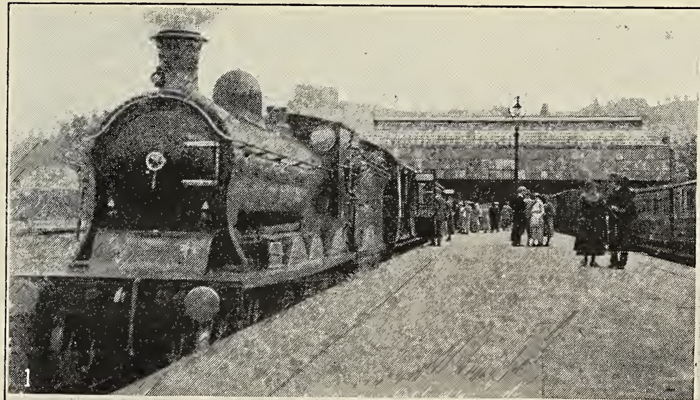
Track of Oban line is dimly discernible high up on the hillside.

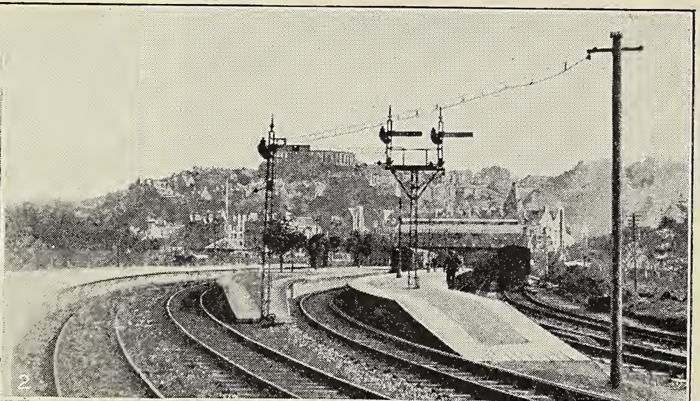
double-platformed station with rather attractive buildings on the down side. Just beyond the station the North British Railway crosses by an overbridge, and Crianlarich Junction is then reached, this controlling the connection with the West Highland line.

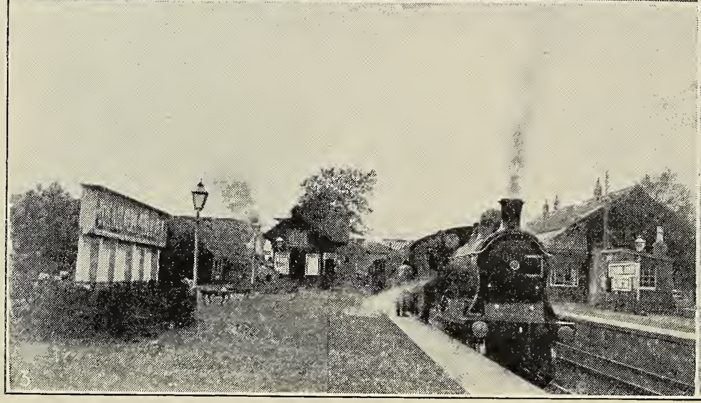
Onwards through Strath Fillan magnificent views are had, and for some miles the West Highland line runs parallel, but on the opposite side of the valley, climbing up the hillside, after crossing the viaduct over the River Fillan until both lines are almost on the same level, with the valley between. Both lines have stations at Tyndrum (a favourite mountain resort), though these are some half-a-mile apart. The Callander and Oban station is a neat tree-shaded erection, with the goods yard at a lower level.

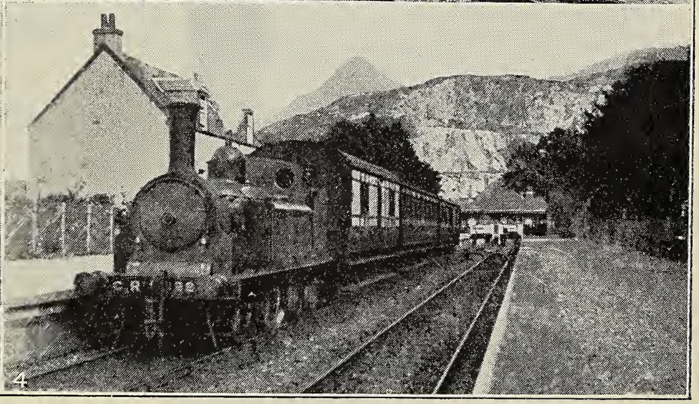
Passing Tyndrum station a final view is had of the West Highland line ere it turns its course northwards, while the Callander and Oban line makes a long sweep southwesterly through Glen Lochy, wild and bare. An intermediate crossing —Glenlochy—breaks the 12-mile run from Tyndrum to Dalmally. Approaching the rather pretty station at the latter place, Glen Orchy is joined, fine views being had along it. Dalmally, at the foot of Glen Orchy, has been described as " the loveliest spot in all that lovely glen." A short run of less than 3 miles crossing the Orchy and rounding a bay on Loch Awe, and incidentally giving beautiful views up the Loch, and Loch Awe station is reached, right on the water side, and with a pier alongside for the steamers which ply along the Loch. For four miles or so the line runs high on the base at Ben Cruachan and follows the shores of the Loch through the gloomy Pass of Brander in which the waters of the loch merge into the brawling River Awe—most turbulent of Highland salmon streams. Three miles beyond Loch Awe station the Falls of Cruachan Platform is a convenience for visitors to the celebrated Falls, a glimpse of which is had from the train in passing. The crossing place is, however, Awe Crossing, a mile or so beyond. A further run of 4½ miles and Taynuilt is reached, beyond which the shores of Loch Etive are followed to Connel Ferry, a run of 6½ miles, with one intermediate station—Ach-na-Cloich—and providing lovely views over the loch and the hills and mountains beyond.

At Connel Ferry, junction for the Ballachulish line, there is a wide island platform serving the up and down main









Photos.] 1. PLATFORM SCENE AT OBAN. 2. GENERAL VIEW OF OBAN STATION. [*J. F. Gairns.*

3. CONNEL FERRY JUNCTION 4. AT BALLACHULISH TERMINUS.

lines, and a single platform on the up side designed for branch trains, though generally these use the main platform to facilitate passenger and luggage transfer. The station has sidings and goods yard. Its height above the village entails high viaducts both on the Oban line and on the approach to the famous Connel Ferry bridge, crossed by Ballachulish trains. Fine views are had of the bridge from the Oban line as it pursues its course high up on the hillside until it cuts inland to attain the summit of Glencruitten. This is at the top of the 3-mile incline at 1 in 50 by which the line zig-zags down to reach the shore at Oban, giving views now over Oban and the landward hills above it, and then, with final sweep round, over the Kerrera Sound and Kerrera Island, to the mountains of Mull and the Firth of Lorne.

Before reaching the terminus a stop is usually made at Oban ticket platform, adjacent to the goods yard and engine shed. Oban station has picturesque buildings surmounted by a clock tower, and the circulating area is adorned with hanging flower baskets. Refreshment and dining rooms are provided. The three main platforms are partly covered by a glazed all-over roof, though their outer curved portions are open. Alongside are two open arrival platforms permitting cabs, &c., to come directly alongside the trains. The station is immediately alongside the steamer pier and harbour premises, the location being peculiarly convenient to the principal hotels, the sea front, and the Corran Esplanade.

Oban—" a little bay "—so widely favoured as a holiday resort, as a boating and yachting centre, and as headquarters for touring the Highlands and the Hebrides in all directions, has been described as the " Charing Cross of the Highlands." Whether readers will agree with this as a happy choice or not, it certainly justifies it as a great steamer traffic and touring centre. Messrs. David MacBrayne, Ltd., operate steamers between Oban, the Sound of Mull and Tobermory to Castlebay and Lochboisdale (" Inner Island Service "), Ardrishaig *via* the Crinan Canal, to Staffa and Iona, to Ballachulish, Kentallen and Fort William, and thence *via* the Caledonian Canal to Inverness, besides many local trips and excursions. Numerous circular tours are also operated, in conjunction with the London Midland and Scottish Railway, rail, motor-car and steamer. Many of these tours are of an extensive nature, and fares are quoted for the throughout journeys.

Returning to Connel Ferry, the Ballachulish line may now be considered. Commencing at Connel Ferry station, the branch train reaches the famous bridge by a viaduct approach over the village of Connel Ferry. The Connel Ferry bridge, claimed to be the Forth Bridge's " biggest British rival," was opened for traffic in August 21, 1903. The bridge, which is of cantilever type (hence the analogy suggested with the Forth Bridge), has a length of 524 ft. between the two piers, the clear span being 500 ft., and the headway above high-water level, 50 ft. Extreme height from high water to the topmost point of the bridge is 125 ft., while the middle span, carried by the two cantilever spans, has a length of 232 ft. This bridge not only enabled a district hitherto most inconveniently situated in regard to rail traffic to be placed in communication with the Callander and Oban Railway at Connel Ferry, but provided a means of crossing Loch Etive, where previously a very lengthy detour had to be made to get from one side to the other, the only alternative being a very uncertain ferry service.

The difficulty having been solved from the railway point of view, there still remained the problem of providing for the transit of motor-cars and other road vehicles across the Loch, and for several years after the opening of the bridge the Caledonian Railway Company conveyed private motor-cars across the bridge by placing them on flat trucks and hauling them, passengers included, by road motor vehicles adapted to run on rails across the bridge.

This method, as indicated, was continued for a considerable time, but, several years ago, the Caledonian Railway Company adopted the alternative method of adapting the bridge also for the passage of motor vehicles, cycles, etc., under their own power. There is not, however, sufficient room for a roadway clear of the railway track, so that it is necessary to restrict the passage of road vehicles to periods when no train is signalled. At each end of the bridge, therefore, gates, under the control of the bridge-keeper, are provided to close the bridge to road traffic when a train is due, and the tablet instruments are controlled by electric circuits in connection with the road gates, to ensure that, unless the gates are properly closed, a tablet cannot be used. The roadway over the bridge comes close up to the rails, there being just sufficient room for a vehicle to pass between the rails and the side of the bridge, and the bridge-keeper has to see that vehicles from both directions are not allowed on the bridge at the same time. These facilities apply only to private motor-cars and horse-drawn vehicles, and not to trade vehicles, of either class. Cyclists and pedestrians also use the bridge. In each case the crossing of the bridge is subject to toll, the men in charge at the Connel Ferry and Benderloch ends acting as toll-keepers. It may be mentioned that, in August last, the bridge was used by 6,009 foot passengers, by 852 motor-cars, and by 290 cycles.

Passing North Connel halt, at the north end of the bridge, the line follows the shore to Benderloch station. At Barcaldine Crossing a platform is provided, where trains call as required. So far, the country traversed has been " comparatively " flat and uninteresting, but as it crosses a peninsula to reach the shores of Loch Creran, mountain vistas again open up. Short of Creagan station the line crosses the Narrows to the Loch by a two-span girder bridge with approach viaducts, fine views being had on both sides.

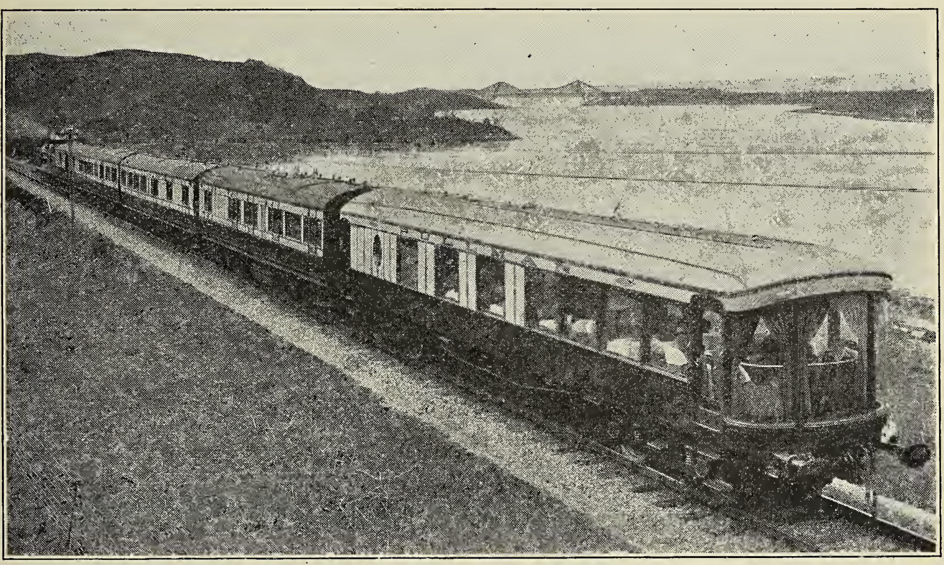
Again crossing a peninsula, Appin is reached, and for the remainder of the journey the line follows closely the shores of Loch Linnhe. As it curves round after leaving Appin station, a good view is had of the ruins of Castle Stalker. Alongside the Loch splendid views are had, and Duror and Kentallen stations are sufficiently picturesque to harmonise with the general character of the scenery. At Ballachulish Ferry station tickets are collected, and the line then curves round to follow the shores of Loch Leven to the terminus at Ballachulish. This is a neat two-platformed station, with dining and refreshment rooms, and the district is impressively mountainous. A short distance from the station is a small harbour, whence a David MacBrayne steamer used to ply three times daily to and from the Kinlochleven wharf of the British Aluminium Company, for goods, passenger and mail traffic. This steamer service has now been withdrawn, a road having been constructed by German prisoners during the war and opened for traffic at the end of last year. A motor service is now operated three times daily each way between Ballachulish and Kinlochleven.

A trip on this steamer was an interesting addition to the journey by rail. The distance is about eight miles, and speed somewhat moderate, but from end to end one was surrounded by scenic attractions, particularly when passing the mouth of the Pass of Glencoe and looking along its mountain-encompassed course. The wharf at Kinlochleven is connected with the British Aluminium Company's premises by a private line, both trains (goods traffic only) and cranes on the wharf being electrically operated.

Traffic on the Callander and Oban line is complicated by the fact that gradients are systematically so severe, 1 in 50 occurring several times for considerable distances, curves are numerous, and in several places reduced speed is necessary owing to the danger of tumbling rocks, notably alongside Loch Lubnaig in Glen Ogle and the Pass of Brander, and automatic alarm wires are erected on some stretches a fall of rock encountering them causing warnings to be given in adjacent signal cabins and watchmen's huts, and putting the special signals to danger. On the steep grades both goods and passenger trains are operated under special restrictions, stops being made at the summits and brakes tested, or, on goods trains, a proportion pinned down before descending. Mountain mists and fogs, occasional torrential rainstorms or cloudbursts and other " episodes " peculiar to mountain lines, also complicate the working at times. But even in winter there is a steady traffic in meeting the transport needs of the wide areas rendered accessible by this line, of the various townships and villages (many are centres for other places within a considerable radius), country houses, castles and large estates, and in carrying mails, supplying coal and, in due season, conveying cattle and other live stock.

The winter train services are, naturally, much reduced as compared with those of the summer, but even the winter service provides four through trains each way daily, a local each way between Oban and Dalmally, and several additional trains between Callander and Glasgow. Sleeping cars and through carriages are provided between Euston and Oban in winter on Fridays only from London, returning on Mondays. The down vehicles are conveyed on the 8.25 a.m. from Stirling, due in Oban at 12.15 p.m. It is also possible to reach Oban at 4.45 p.m. from London by the 11 p.m. from Euston the night before, and by the 5 a.m. from Euston at 9.50 p.m., the same night, though not, of course, with through carriages. A further service is given by the 1.30 p.m., reaching Oban at 4.44 a.m. next morning. This latter train, 12.15 a.m. from Stirling, is notable in that it does not stop at several stations. In the opposite direction the 5.40 a.m. from Oban enables London to be reached at 7.30 p.m. and the 9.10 a.m. at 10.45 p.m. The 11.50 a.m. gives a connection to London due at 5 a.m., while the 5 p.m., which conveys the through carriages and sleeping cars on Mondays, is due in Euston at 6.55 a.m. To and from Edinburgh and Glasgow there are quite good services with through carriages between Glasgow and Oban.

Between the seasons the services are somewhat improved, the through carriages and sleeping cars running daily during July, August, September and the first half of October, and are somewhat expedited. During the summer months, however, there is quite a good service and at times the loads conveyed are considerable. The London through carriages and sleeping cars leave Euston at 7.50 p.m. and go forward from Stirling at 6 a.m., reaching Oban at 9.50 a.m. They are followed by the 8 a.m. from Glasgow. The 9.45 a.m. from Glasgow (Buchanan Street), leaving Stirling at 10.35 a.m., is the favourite train for Glasgow and Edinburgh passengers. It conveys a Pullman observation car, which has proved very popular indeed since its introduction. This train reaches Oban at 2.36 p.m. Connecting with the 12.10 p.m, from Glasgow (Buchanan Street), the 1.5 p.m. from Stirling reaches Oban at 4.49 p.m., while the 5.10 p.m. from Glasgow (Stirling 6 p.m.), which conveys a third-class Pullman buffet car, is due at Oban at 9.40 p.m. The night service off the 10 p.m. from Glasgow reaches Oban at 4.50 a.m. There are also seven or eight



TRAIN WITH PULLMAN OBSERVATION CAR IN REAR.

Connel Ferry Bridge in distance.

additional trains between Stirling and Callander. In the opposite direction the trains from Oban are: 5.40 a.m. to Glasgow, giving a connection to London, due 7.30 p.m.; 9.10 a.m. with through carriages for Glasgow and giving a London connection due 10.45 p.m.; 10 a.m. local to Loch Awe; 11.15 a.m. additional train during June, July and August, with third class Pullman buffet car; 11.50 a.m. to Glasgow; 3.35 p.m. for Glasgow with Pullman observation car; 5.15 p.m. for Glasgow, with through carriages and sleeping cars for London until September 30 (commencing September 3, the through carriage and sleeping saloons for London will be run on the 6.25 p.m. from Oban); and, commencing September 3, the 6.25 p.m. to Stirling, with connection to London, due there 7.40 a.m. On the Ballachulish branch three services are provided each way. The Killin branch train runs between Killin Junction and Killin and on to Killin Pier when required to connect with main line trains and with the steamers.

A number of tours and excursion arrangements are in force combining rail, steamer and coach facilities. In summer the Loch Tay steamers between Killin Pier and Kenmore make three trips each way daily, and combined tours are arranged from Glasgow and Edinburgh, &c., via Callander to Killin Pier, thence by steamer to Kenmore, by coach to Aberfeldy, returning via the Highland section of the London Midland and Scottish Railway and Perth. This is also arranged the other way, providing a most attractive "round tour."

On Loch Awe the railway steamer makes one journey each way daily from Loch Awe Pier to Ford, a steam launch also plying between Loch Awe Pier and Taycreggan and Port Sonachan. From Oban and other centres a combined tour is provided to Loch Awe station by rail, thence by steamer to Ford, returning to Oban by motor coach through the Pass of Melfort or in the reverse order. The famous "Trossachs" tour centres upon Callander, from whence motors run to Trossachs, linking up there with the Loch Katrine steamer, and so on to Loch Lomond. Other associated services are by motor launch between Taynuilt and Lochetivehead, by coach between Ballachulish and Glencoe, and by motor between Oban and Easdale. A special tour arranged in conjunction with the railway is the Glencoe and Glenetive tour, by rail to Achnacloich station, thence by motor launch from Achnacloich to Loch Etive, passing Ardchattan Priory, Bonawe, &c.; motor drive from Lochetivehead, passing Dalness, Dalness Deer Forest, Buchailetive (Shepherd of Etive), the Devil's Staircase, the "Lord Chancellor," Ossian's Cave, Pass of Glencoe (scene of the massacre); returning home by train from Ballachulish, or the route may be reversed. Cheap daily excursion tickets are issued in summer by the London Midland and Scottish Railway to all stations on or connected with the Callander and Oban and Ballachulish lines.

The locomotives generally employed are the well-known "Oban" 4-6-0's, with 5-ft. coupled wheels, together with Mr. Pickersgill's new "Oban" class recently introduced, though odd trips are taken by 0-6-0 goods engines, which also render assistance on the steep grades. On the Killin branch and the Ballachulish extension 0-4-4 tank engines of the 4 ft. 6 in. class are used. Between Dunblane and Callander main line 4-4-0 locomotives from Glasgow or Stirling and 0-6-0 goods engines are used, as well as the Oban 4-6-0's on the through trains, a change being sometimes made at Callander. The Callander and Oban line and the Ballachulish extension are controlled by electric train tablet apparatus. Ordinary train staff is used on the Killin branch.

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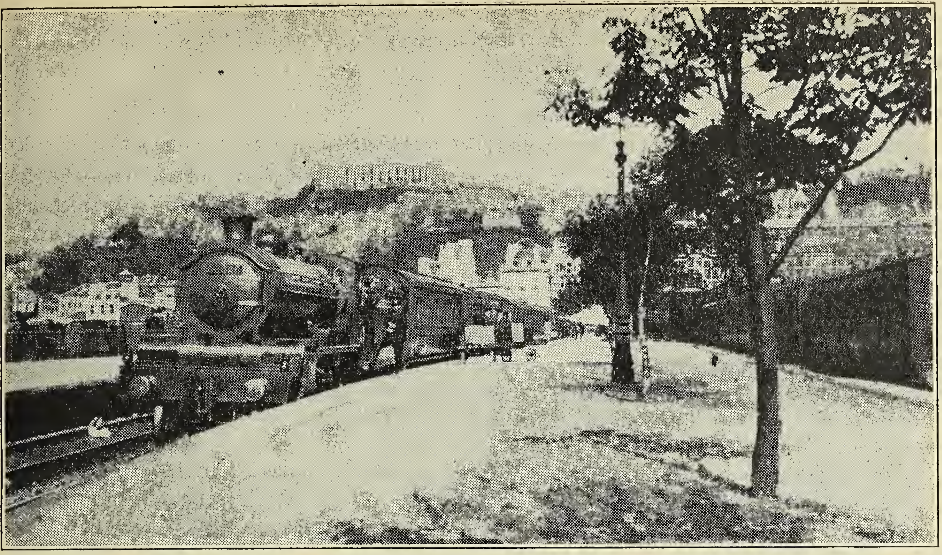


Photo.] [*J. F. Gairns.*

GLASGOW PULLMAN OBSERVATION CAR EXPRESS AT OBAN.

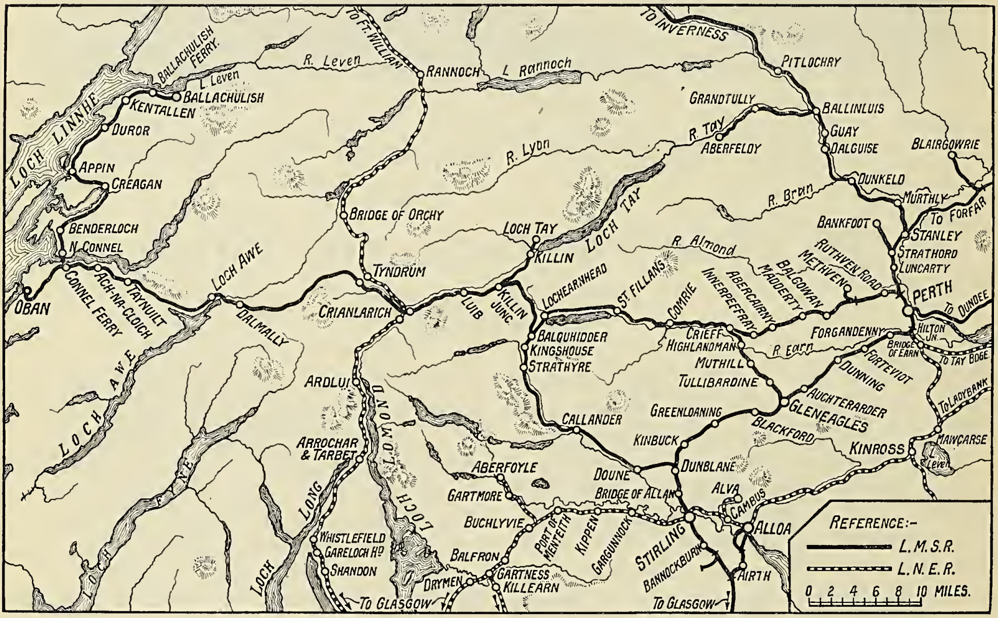
To Oban via Perth and Crieff.

By J. FRANCIS.

THE formation of the London Midland and Scottish Railway has brought under one ownership two of the three great scenic main lines which penetrate the Scottish Highlands, the Callander and Oban, and Highland lines, the third being the West Highland section of the L.N.E.R., though there are, of course, many other sections of both systems which require to be classed with them, in regard to scenic attractions, if not in respect of main line characteristics. But while the other two have to be considered on a throughout basis, the Callander and Oban line has the peculiarity of a triple approach route. Each of these, moreover, counts for a great deal from the scenic point of view, and in this article the routes from Perth via Crieff and from Gleneagles to Crieff receive primary attention, though further remarks are included as to the Oban route as a whole, supplementing the article thereon published in the July, 1923, number of the RAILWAY MAGAZINE.

The Gleneagles (until recent years named "Crieff Junction")-Crieff line dates from quite early days, as both this section and the Dunblane, Doune and Callander line were associated with the Scottish Central Railway before it was amalgamated with the Caledonian Railway in 1865. The same, in fact, applies to the Perth, Almond Valley and Methven Railway, leaving the then Scottish North Eastern Railway, and for which Parliamentary powers were obtained in 1856, the extension from Methven Junction to Crieff being completed in 1867. The Dunblane and Callander and Crieff Junction–Crieff lines were constructed under powers granted in 1856 and 1853 respectively. Subsequently, the line was extended from Crieff to Comrie, though the remainder of the route is of later date, the Comrie–St. Fillans portion being opened in October, 1901, St. Fillans to Lochearnhead in July, 1904, and the last link, to join the Oban line at Balquhidder, in 1905. Originally, the station at Balquhidder, on the Oban route, was known as Lochearnhead, but when the branch was completed that name was transferred to the present station used by trains to and from Crieff, the Oban line station, rebuilt on a new site to suit the junction entailed, taking its present name. The construction of the Comrie-Balquhidder section was described in the August, 1904, Railway Magazine, while reference may also be made to articles by Mr. G. W. J. Potter in the August and September, 1912, numbers.

Although the completion of the route from Crieff through to Balquhidder is a matter of comparatively recent date, the Crieff branch from Gleneagles has for many a year been a comparatively busy one. Indeed, long before the little station known as Crieff Junction blossomed out with the new and now well-known name of Gleneagles, and when there was no thought of the world-famous golf courses or of the magnificent Gleneagles Hotel, with its manifold and in many respects unique attractions and facilities, there was a considerable amount of interchange of traffic between main line and branch trains, in addition to the through working of certain trains or of through carriages. There was, it is to be presumed, a village at the junction, and the name Gleneagles may have been known locally in those days. But the real purpose of the station was to serve the branch to Crieff, and, in default of any occasion to use a local name, it took that of the town, nine miles away, to which it gave access, as in the case of many another little "Junction" station which owes its later development to the fact that it was erected for junction purposes.



MAP SHOWING CALLANDER AND OBAN LINE, CONNECTIONS AND BRANCHES.

In view of the fact that the Gleneagles golf courses were already in full swing, an entirely new station was put in hand some years ago. This, "Built in 1919, the year of the peace after the Great War," as the commemorative stone intimates, is of exceedingly handsome design, while the arrangement of the track lay-out and station facilities are everything that could be desired. There could, indeed, be no greater contrast than that between the old station—Crieff Junction, as it then was—and the new Gleneagles. Previously the station consisted of a set of old wooden buildings situated on the up line side and on the island and down branch platforms. The platforms were low and short, an overbridge from the up to the down main lines was not used so much as level crossings at the platform ends, and other level crossings provided the only means of passage from the down main line platform to the down branch platform and of communication between the station and the public road.

The remodelling of the station facilities necessitated far more than the building of the station. Previously the branch line to Crieff crossed the main public highway from Glasgow to Perth on the level some 200 yards from the station, this involving the constant attendance of a crossing keeper and irritating delays to road traffic, while the main outlet from the station to the highway was by means of a sunken roadway, which was something of a quagmire in wet weather. The level crossing has been abolished by diverting both the highway and the branch line, so that the road is now carried under the line, and the change has also been of great advantage to the junction working.

The approach roadway, which from the public road to the entrance hall is some 400 yards in length, forms what must be one of the finest station-approach roads in the kingdom. It begins on the public highway at a point opposite the junction of the private road from the golf courses. The entrance to the avenue is semicircular, rendering easy the passage of vehicles from and to the public road in both directions. The avenue consists of a road and footpath, flanked by a substantial white-painted four-bar fence, immediately behind which are rows of trees with suitable shrubs interposed.

The station entrance hall, into which the avenue leads, is built in the Scottish baronial style, with crow-stepped gables and miniature turrets. On one side there is a commodious booking office and a parcels office, and facing the entrance is the overbridge leading to the platforms. A train information board is provided on the overbridge to enlighten passengers as to the time and departure platform of their trains. The continuation of the overbridge to the up line side is covered in, and opposite the top of each of the stairways are alcoves containing flowering plants and shrubs.

The buildings on both platforms are solidly built and of handsome appearance. Those on the island platform include stationmaster's room, waiting room, &c., and porters' room. In the passage dividing the buildings are located a fruit-stall and bookstalls. The rooms on the up side consist of ticket collectors' and waiting rooms. The signal-box is situated at the north end of the island platform. It may be added that the platforms and the adjoining bank on the up line side are tastefully laid out in walks and plots, and their pleasing appearance is reflected in the fact that Gleneagles was awarded a first-class premium in the best-kept station competition.

The bulk of the passenger traffic for and from Auchterarder—a holiday resort a mile to the west of the main line—is dealt with at Gleneagles, which also serves the widely scattered district to the south. It also deals with the traffic to the increasingly popular resorts of Crieff, Comrie, St. Fillans and Loch Earn, most of which, however, is conveyed in through carriages from Glasgow, Edinburgh, &c.

The Gleneagles Hotel was illustrated and described in the September, 1924, number of the Railway Magazine. It is a magnificent building, designed to harmonise with its picturesque natural surroundings. Accommodation is provided for about 300 visitors. In addition, there are about 100 bathrooms, a swimming pool, and a garage with accommodation for 100 motor cars, with facilities for the purchase of motor accessories and for the carrying out of light repairs. Other special features of the hotel are a ballroom with stage, and a grand corridor in which the Gleneagles dance bands perform as required, together with postal, banking and other facilities. Central heating, electric lighting and electric lifts are installed, while there is also a wireless equipment, by arrangement with the British Broadcasting Company.

The branch leaves directly at the west end of the station, and is single line, with stations at Tullibardine, Muthill (crossing), and Highlandman in the course of its length of 9 miles. It passes through attractive scenery, particularly near the peculiarly named station of Highlandman, where it crosses the River Earn. About a mile before reaching Crieff station connection is made with the route from Perth via Methven Junction. The station has separate platforms, with a middle line between, and neat buildings, well-covered platforms and attractive platform gardens and floral adornments. The goods yard, engine shed, and other premises are all at the east end. Crieff claims to be the most picturesquely situated hill town in Scotland. Whether this is true or not, it has become a very popular health resort, being situated on the southern face of a hill called "The Knock," and sheltered from cold winds, while it is a splendid centre for touring, historic and antiquarian interest. It is, by the way, the second largest town in Perthshire.

Before continuing further, it will be convenient to consider now the later route from Perth to Crieff via Methven Junction. This leaves the L.M.S. main line to Aberdeen about a mile from Perth, at Almond Valley Junction. There it becomes single-track. The first station, Ruthven Road Crossing, is a small one of an intermediate character, at which only certain trains call, others making their first stop at Almondbank, 4 miles from Perth. Here there is a single platform on the up side. Then comes Tibbermuir Crossing, also omitted by many trains, after which a station which does not appear in the public time-tables is reached. This is Methven Junction, erected solely to provide for connections with the branch line to Methven. This branch was, in fact, the original line, though it lost its importance when the extension to Crieff left it at the junction. The branch is now worked by a small tank engine and two or three coaches, the train making one or two journeys through to Perth on Saturdays in addition to its usual duty of maintaining connections. The junction station has two through platform lines, as it is adapted for crossing trains, with a side platform for the branch train.

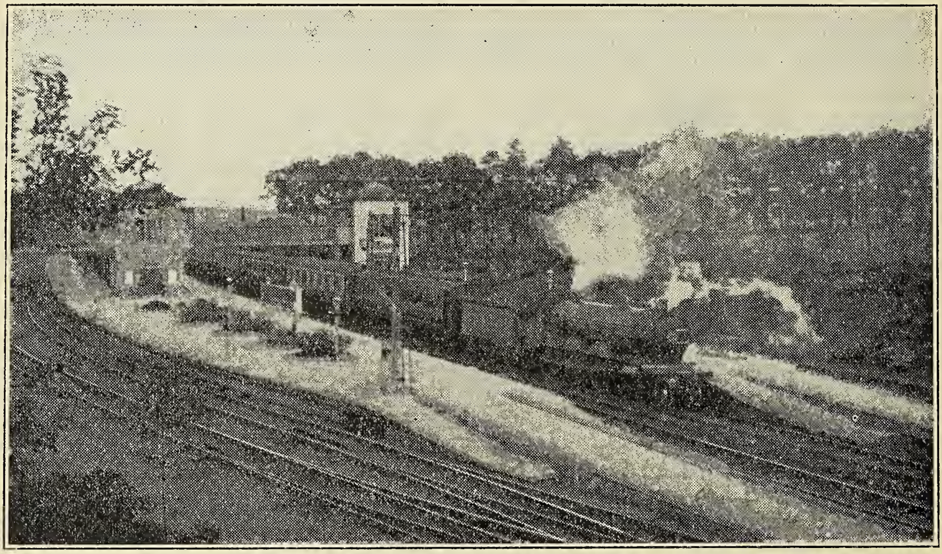


Photo.] [*Rev. J. S. Caddick-Adams.*

LONDON EXPRESS AT GLENEAGLES.

So far, although the River Almond is a near neighbour, the scenery passed is fairly ordinary in character, but as the journey is continued it becomes prettier, though not, as yet, calling for special remark. Balgowan is a non-crossing station, Madderly has the usual two platforms, and Abercairny and Innerpeffray single platforms only. All have station gardens and rank among the many neat station erections characteristic of so much of the late Caledonian system. Soon after leaving Innerpeffray station, not far from Highlandman on the Gleneagles line, connection is made with the latter route, which is common for both services of trains thence to Crieff, where connections are made when one route has a through train for beyond Crieff and one a train terminating at Crieff.

It is however, after leaving Crieff that the scenic beauties of the route are most manifest. The first stage is of six miles, to Comrie. After passing through a short tunnel, the River Earn joins company, the scenery of its picturesque valley accounting for much of the beauty of this run. About two miles after leaving Crieff, the line passes close to Tomachastle Hill, on which is an obelisk to the memory of General Sir David Baird, who overthrew Tippoo Sahib at Seringapatam at the close of the 18th century. Continuing in close company with the River Earn, and with many attractive views, diversified by glimpses of the mountains as they are approached, the train soon pulls up at the town of Comrie, another hill resort, having favourable climatic conditions all the year round, sheltered by wooded hills in the immediate vicinity and by mountains to the north and west. The station is in keeping with the characteristic features of Caledonian station practice.

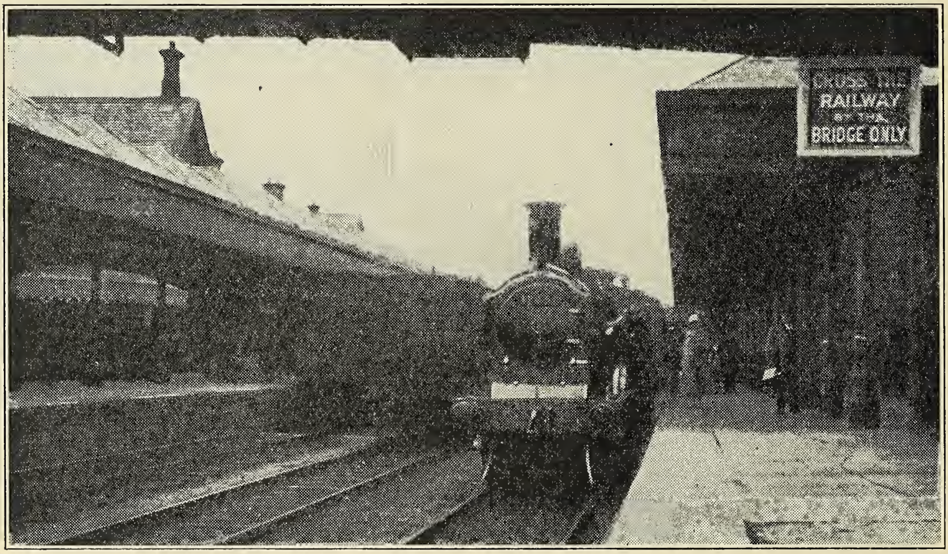
Just beyond, a loop of the River Earn is crossed by a girder bridge, with road bridge alongside. Here a glimpse is had of a monument to the First Lord Melville on the summit of Dunmore Hill, above the town of Comrie. Two and three-quarter miles from Comrie is Dalchouzie Platform, at which trains call as required. This is located in a wood among pretty surroundings, which continue all the way to St. Fillans, still in company with the River Earn, which is crossed again on this stage. The combination of well-wooded and picturesque hill and river scenery near and the bare wildness of the mountains which are being approached make effective contrast.

St. Fillans is a pretty village possessing many facilities for permanent and holiday residence, and is located at the east end of Loch Earn. It is beautifully situated in the valley of the Earn as it joins the Loch. The next stage is, however, the scenic *pièce de résistance* of the route, in that for the next seven miles the line follows the shores of Loch Earn practically from end to end, the Loch being first seen as the railway curves round its eastern end and then, section by section, amidst its mountain surroundings.

Construction of the railway was, however, a costly undertaking. The first half-mile involved heavy rock cuttings and tunnellings; one and a quarter miles from St. Fillans a viaduct spans a ravine, where a glimpse is had of a waterfall of substantial character; and other and smaller ravines are met with until the gradient eases and the line continues at about 130 ft. above the level of the Loch for the next mile or so. The railway then descends, still on a track cut out from or built upon the rocky surroundings of the Loch, until at the point where it crosses the Beich Burn, it is only 40 ft. above water level. It climbs again to a height of 100 ft., and then falls to cross the end of Glen Ogle by the famous Lochearnhead Viaduct. This is curved, so that the passenger has good views of its nine arches of 40 ft. span, both approaching and leaving.

BALQUHIDDER STATION.

After crossing the viaduct, Lochearnhead station, with its neat island platform, is reached, tickets being checked in the case of trains for Balquhidder. The final section, including a rather heavy grade to reach the level of the Oban line, involves the crossing of Channdroma Water by a viaduct of seven arches of 40 ft. span and a steel girder span of 80 ft. The present Balquhidder station, which replaced the earlier one from which Lochearnhead station took its name, has a long and wide island on the up side, so that branch trains can be dealt with on its outer face, and a single platform on the down side, with sidings, engine shed, etc., adjacent.



PERTH-BALQUHIDDER TRAIN AT CRIEFF.

In that the routes from Gleneagles and Perth to Crieff and beyond are in the nature of branches, the trains consist of coaches of ordinary and normally older types, except that a few through carriages run between Glasgow and Crieff, and as the gradients are frequently severe, 0-6-0 goods engines are usually employed, though occasionally 4-4-0 tender and 0-4-4 tank engines are to be met with on the shorter runs. Between Gleneagles and Crieff there are 12 or 13 trains each way daily, some being booked to call at Tullibardine and Highlandman conditionally only, if at all. Three of these trains are extended to St. Fillans, three others to Comrie, and one through to Balquhidder, the remainder terminating at Crieff, where connection is made with the trains from Perth, which usually provide for journeys throughout. The Perth route has four trains through to Balquhidder and a fifth on Saturdays, while there are three (on Saturdays four) others between Perth and Crieff. Further, several of the Perth trains are more or less fast between Perth and Crieff, notably the 8.30 and 10.10 a.m., which are non-stop, and the 5.22 p.m., which has only a conditional call at Almondbank. Similarly, in the opposite direction, the 8.30 a.m. from Crieff calls only at Almondbank, and the 12 a.m. and 1.30 p.m. from Balquhidder which make the non-stop run between Crieff and Perth.

Although the direct line from Dunblane to Oban was described in July, 1923, the whole route is one of so surpassing interest that a few further remarks may appropriately be added, in that there is much to be said for making the journey to Oban via one or other of the routes described as an alternative to the Callander–Balquhidder route. This should only be done one way, however; otherwise, the traveller who makes his first journey would miss the many outstanding scenic beauties of the Callander line south of Balquhidder, especially the stretch alongside Loch Lubnaig and through the Pass of Leny.

Leaving Balquhidder, the Oban line

climbs steeply into Glen Ogle, overlooking the descending route to Lochearnhead, already described, ere it turns eastwards, and giving a splendid view of Lochearnhead Viaduct and along Loch Earn from the lofty vantage point reached in a couple of miles or so. Glenoglehead is an intermediate crossing place on the run to Killin Junction, approaching which a view is had of the little town of Killin, at the end of Loch Tay, and the branch line therefrom which joins the Oban line at the junction. At Crianlarich passengers can interchange with the West Highland trains of the L.N.E.R., and after passing under that line the Oban route continues on one side of Strath Fillan, with the West Highland line on the other side.

After leaving Tyndrum no more is seen of the West Highland line, and Oban trains continue through Glen Lochy to Dalmally (a refreshment station), alongside Loch Awe, through the Pass of Brander to Taynuilt and onwards to Connel Ferry. The waters of Loch Etive have been in sight for a mile or two, and as the station is neared a good view is had of Connel Ferry bridge carrying the Ballachulish branch across the Loch. Then a steep climb to Glencruitten, a crossing place, after which a zigzag and curved descent, including fine views over Oban bay and town, leads to the ticket collecting platform, and so to the pretty station which terminates the route.

It is hardly necessary to say much about Oban, probably the most distinctive of all the more northerly holiday resorts of Scotland. It is a fair-sized place, with many hotels to suit all purses, besides boarding houses and apartments. From the pier numerous steamer services are operated, local or to the Inner and Outer Hebrides, while motor road touring is well catered for. Excursion fares, on a cheap and convenient basis, are in operation wherever justified on the railway route, while several combined rail and road or rail, steamer and road tours are operated during the holiday months. One of the most interesting of these is a " Grand Circular Tour " by motor from Oban to Ford, via the Pass of Melfort, steamer to Loch Awe Pier and train back to Oban, or *vice versa*. An alternative is by train from Oban to Loch Awe and steamer to Ford, returning the same way, the day cost of which is seven shillings only.

The Oban line has, in summer, quite a good train service. The first is the 5.50 a.m. from Stirling, conveying through carriages and sleeping car from Euston the previous night. This reaches Oban at 9.26 a.m. The next is the 8.50 a.m. from Stirling (8.0 a.m. from Glasgow,

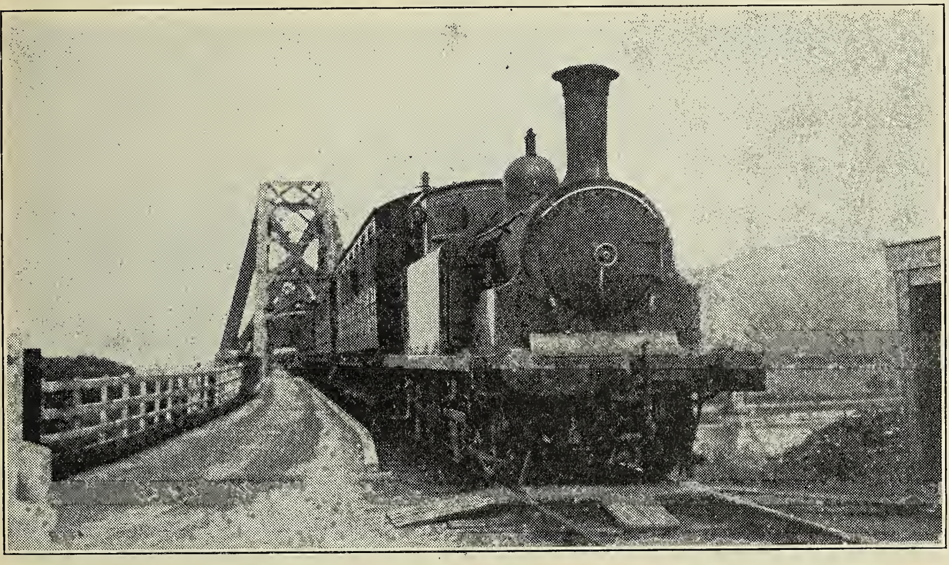
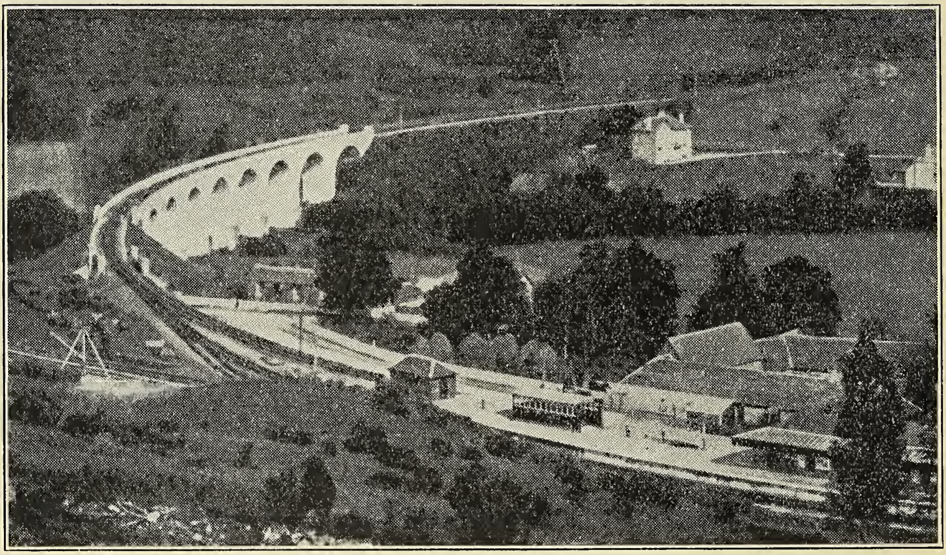


Photo.] **TRAIN CROSSING CONNEL FERRY BRIDGE.** [*E. A. Gurney-Smith.*

Buchanan Street), by which passengers can make the well-known "Trossachs Tour," from Callander by coach to the Trossachs Hotel, steamer on Loch Katrine to Stronachlacher, coach to Inversnaid and Loch Lomond steamer to Balloch and train back to Glasgow (or Edinburgh). The same trip can be made by the 9.45 a.m. from Glasgow and 9.25 a.m. from Edinburgh, which for Oban is notable in providing the outward journey of the now well-known and deservedly popular Pullman Observation Car. This is attached at the end of the train, its rear portion being rounded and glazed from roof to floor, so that passengers seated in the comfortable armchairs provided have practically uninterrupted views of the magnificent scenery of the route. Incidentally, lunch can be had *en route.* Although the car is restricted to first-class passengers, and is subject to a small supplementary charge, the adjoining vehicle is utilised for serving lunch to third-class passengers, so that they have the advantage of the restaurant facilities, if not of the car itself. The remaining down services: from Stirling, 1.4 (12.10 p.m. from Glasgow), 2.42, 5.31 (5.10 p.m. from Glasgow), with third-class Pullman Buffet Car (first-class passengers served in adjoining vehicle), and the night train at 12.15 a.m.

In the opposite direction the trains from Oban are the 6.20, 8.50, 11.5 (third-class Pullman Buffet Car to Glasgow) a.m., 12 noon, 3.45 (with First-Class Pullman Observation Car), 5 and 6.15 (with through carriages and sleeping car for London) p.m. Some of these trains omit certain intermediate stations, but the most unusual feature is the fact that the 11.5 a.m. from Oban is booked to call only at Balquhidder between Dalmally and Callander. During early spring and late autumn certain alterations are made, while the winter service is, of course, reduced; but during the summer the facilities provided are quite good and adapted to meet the needs of the considerable traffic then passing. Most of the Crieff trains connect with Oban trains in one or both directions at Balquhidder. The Crieff route is, moreover, associated with several of the special tours arranged by the L.M.S.R., as, for example, one from Edinburgh, Glasgow and other towns via Crieff and Aberfeldy (on the Highland section), Loch Tay, Killin and Callander, utilising rail, road and steamer. Also several other interesting and varied circular tours and day excursions.



LOCHEARNHEAD VIADUCT AND STATION.

Aug. 1912

Rambles on the Caledonian Railway.

Perth to Oban and Ballachulish.—[No. 1.]

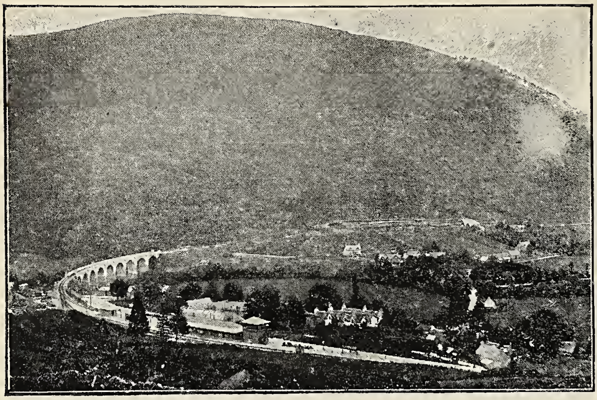
By G. W. J. POTTER.

VIADUCT AT CONNEL FERRY.

A SURVEY of the map in the Caledonian Railway time-book will disclose the fact that it is possible to travel between Perth and Oban or Ballachulish by three different routes. By this statement it is not meant that there are three distinct lines of travel throughout the entire journey —for after passing Balquhidder all trains run over the same metals westward to their terminus at Oban or Ballachulish, as the case may be—but that it is possible to reach that point from Perth by one of three methods. These are: (1) Leave Perth in a northerly direction, thence by way of Methven Junction and Crieff to Balquhidder; (2) depart from Perth by a southbound train, leave the main line at Gleneagles, and join No. 1 at Crieff; (3) as in No. 2, but continue along the main line as far as Dunblane, whence the old and original route *viâ* Callander is entered upon, and Nos. 1 and 2 are met with at Balquhidder. Gleneagles is the present name of the station formerly known as Crieff Junction.

A recent stay in the ancient and beautiful city of Perth provided the opportunity of visiting both Oban and Ballachulish, and, following the pleasant and correct custom of all good railway enthusiasts, I naturally made it my especial business to travel by each one of the available routes. Hence it is here proposed to touch briefly upon the different train services by which it is possible to journey across the centre of Scotland between the " Fair City " on the river Tay and the bright little seaside town on the Firth of Lorne. The times of trains referred to were those in force during the summer of 1911. A few details as to the mileage of the three routes may not be deemed out of place. From Perth *viâ* Almondbank and Methven Junction the distance is 17 miles 65 chains to Crieff, and 21 miles 7 chains thence to Balquhidder. By the main line from Perth to Gleneagles it is 15 miles 63 chains, and an additional 9 miles are required to reach the town and station of Crieff. Hence this route is 24 miles 63 chains, as compared with the previous one of 17 miles 65 chains. Continuing along the main line the distance from Perth to Dunblane is 28 miles 3 chains. Thence to Balquhidder is 22 miles 66 chains, the important station of Callander dividing the section into two nearly equal lengths: Dunblane to Callander 11 miles 9 chains, and Callander to Balquhidder 11 miles 57 chains. From Balquhidder to Oban is 59 miles 6 chains, and to Ballachulish 80 miles 46 chains. Hence the distances from Perth are as set out in the annexed table:—

Perth to		*viâ* Almond-bank.		*viâ* Gleneagles.		*viâ* Dunblane.	
		M.	C.	M.	C.	M.	C.
Balquhidder	..	38	72	45	70	50	69
Connel Ferry	..	91	64	98	62	103	61
Oban ..	..	97	78	104	76	109	75
Ballachulish	..	119	38	126	36	131	35



LOCHEARNHEAD STATION AND VIADUCT.

The time table of trains between Perth and Balquhidder, Oban, or Ballachulish by the three routes is given in a condensed form, and its study will reveal the fact that by certain trains each route has a particular advantage, though naturally the shortest in mileage is usually also the shortest in time.

Perth to Oban.

	a.m.	a.m.	p.m.	p.m.	p.m.	p.m.	p.m.
Leave Perth *viâ* Almondbank ..	7 43	10 20	12 20	(2 20)	—	5 5	—
Gleneagles ..	—	8 0	—	1 50	*	—	—
Dunblane ..	7 20	—	—	1 50	3 55	4 4	10 5
Arrive Oban	11 45	2 25	4 50	6 35	7 32	9 0	4 15

* Fridays only.

Oban to Perth.

	a.m.	a.m.	a.m.	p.m.	p.m.	p.m.	p.m.
Leave Oban	6 0	7 55	10 0	12 35	3 25	4 15	7 0
Arrive Perth *viâ* Dunblane ..	10 55	11 43	3 18	5 36	7 45	8 42	12 8
Gleneagles ..	10 55	—	2 12	—	—	—	—
Almondbank ..	10 0	—	3 21	5 17	—	8 45	—

Some local trains between Perth, Crieff, Balquhidder and Callander have been omitted as not being within the scope of this article. Where services are available by each line, that by Aldmondbank is usually the quickest, and the shortest journey from Perth to Oban is made in 3 hrs. 55 min. by the 5.5 p.m. running *viâ* that route. The first train shows a difference of only 23 min., Perth *viâ* Dunblane being left at 7.20, and *viâ* Almondbank at 7.43. The smartest run occurs once a week. On Fridays one can leave by the 3.55 p.m., and, changing at Dunblane, continue by the 4.50 express to Oban, arriving there at 7.32, a journey time of only 3 hrs. 37 min. On week-days the passenger leaving Perth at 1.50 p.m. has the option of travelling direct to Dunblane, changing there into the Oban train; or he can leave the main line at Gleneagles, and travel thence *viâ* Crieff to Balquhidder, where he will join the vehicles from Dunblane. On Saturdays he has the privilege of quitting Perth half-an-hour later (2.20 p.m.) and, travelling *viâ* Almondbank, will pick up the Gleneagles train at Crieff, and that from Dunblane at Balquhidder.

Journeying from Oban, the quickest time is provided by the 7.55 a.m., due in Perth at 11.43, the route being *viâ* Dunblane. The Crieff line shows to the best advantage in connection with the 10 a.m. from Oban, for by it Perth can be reached at 2.12, as against 3.18 *viâ* Dunblane or 3.21 by the Almond-bank route. The best times therefore stand as follows :—

CREAGAN BRIDGE OVER LOCH CRERAN.

Oban to Perth.	M. C.	H. M.
Dunblane route	109 75	3 48
Almondbank route	97 78	4 0
Gleneagles route	104 76	4 12

Perth to Oban.	H. M.
Almondbank route	3 55
Gleneagles route	4 45
Dunblane route	4 45 (3.37 F.O.)

When the nature of the country through which the line runs, the comparative sparseness of the population, and the delays incidental to single-line working with long sections are considered, it must be admitted that an excellent service is maintained by the Caledonian authorities between Oban and the main line. Further, it may be said that the waits at the junction stations are, on the whole, of not unreasonable length, and in many cases the connections very smartly timed. Having thus briefly described the present-day train services, it will be desirable to give some account of the three lines to Balquhidder and the route thence to Oban and Ballachulish, beginning with the earliest—that *viâ* Dunblane and Callander. It must be borne in mind that in many cases the present direct railways between certain towns are the result of developments spread over many years, and that the modern route often differs very considerably from that formerly in use.

Photo] [*R. A. Chrystal.*

OBAN: CALEDONIAN RAILWAY.
Showing old (4-4-0) and new (4-6-0) engines, specially designed for working the Callander and Oban section.

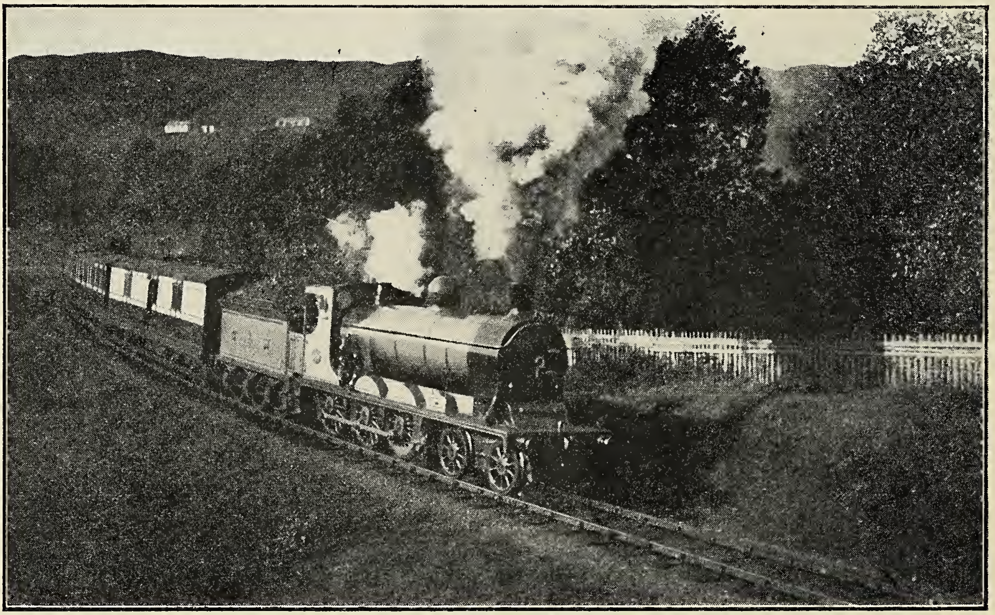
The perusal of an early railway map, such as that issued by the Railway Clearing House, which is printed in colours, enabling one to see the extent of the territory owned or controlled by the different companies, will afford much enlightenment as to the growth of the railway system as it now exists. An issue of this particular map, published probably about 1858—map-makers, wise in their generation, then as now, having usually a rooted objection to dating their maps—thus portrays the railway lines which were then in operation in the district under review. The Scottish Central Railway owned the section from Stirling to Perth, and from Perth onwards the line was the property of the Scottish North Eastern Railway Company. Germs of our three routes to the western seas were already in operation, and in different colours, denoting separate companies, are shown the Dunblane, Doune, and Callander (Act 1856); the Crieff Junction (Act 1853) leading to Crieff from what is styled the Junction station; and the Perth, Almond Valley, and Methven (Act 1856) which left the Scottish North Eastern a little way north of Perth. In July, 1864, an Act was obtained to link up the towns of Crieff and Methven, and this work was accomplished in 1867.

In 1865 an independent company procured powers to construct a line from Callander to Oban, and after various troubles and delays, Oban was placed in communication with the general railway system of Scotland. It speaks well for the promoters that the scheme was carried to a successful conclusion. The line was opened in sections as follows: Callander to Killin, June, 1870; to Tyndrum, August, 1873; to Dalmally, May, 1877; and to Oban, June, 1880. Leaving Dunblane the traveller passes Doune, and arrives at Callander, the terminus of the first railway made in this direction. It may be noted that the Dunblane, Doune, and Callander Railway Company, with a total track of 11 miles 9 chains, managed to include in its name all the stations which it proposed to serve. Perhaps it may be said, and with some show of truth, that the smaller the company the more imposing the title. From the Callander and Oban Junction box to Callander West is double line. Otherwise the 81 miles from the main line to Oban are single, with the natural exceptions of certain stations and crossing places.

Callander is noted in Scottish tourist history, and is the point from which the lovely district of the Trossachs and Loch Katrine is entered either on wheel or afoot. The whole country is full of charm, and the traveller would do well to refresh his recollection of Sir Walter Scott's "Lady of the Lake" before visiting these parts. Many of the places and scenes described in the poem can to-day be accurately identified. This is hardly the place wherein to dwell upon that subject, and readers must be referred to the various publications of the Caledonian Railway and to local guide books. One of the latter contains an excellent topographical analysis of the poem by Sir George Airy, and relates how most of the points referred to can be reached by the pedestrian.

From Callander the railway bends away northward and westward, following the route of the Fiery Cross, as described in "The Lady of the Lake," and by the shores of Loch Lubnaig makes its way to Balquhidder, at the head of Loch Earn. The original station formerly bore the name of Lochearnhead, but on the completion of the section from Crieff and Comrie, a fresh structure was erected about 170 yards to the westward, so as to provide a more favourable junction and gradient for the new line, and the name was altered to Balquhidder, the title of Lochearnhead being given to a station two miles away on the new railway close to the head of Loch Earn.

For a hilly country, the gradients have not so far presented any special difficulty, though the tendency has nearly always been upward, and there have been two banks of 1 in 60, each about a mile in length; but from



Photo] [*R. A. Chrystal.*

CALEDONIAN RAILWAY.

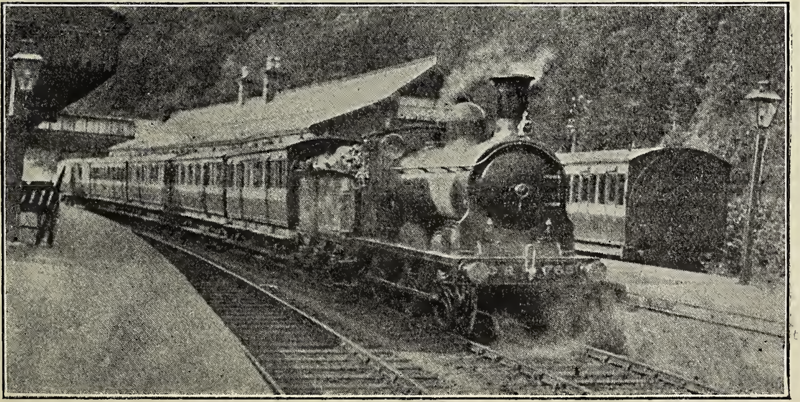
Callander and Oban train ascending 1 in 50 gradient near Oban. 4-6-0 locomotive, No. 54.

Balquhidder the west-bound train has five continuous miles of this gradient to surmount ere the summit at Glenoglehead Crossing is reached. Such trains as do not stop at Balquhidder encounter the full length of the $4\frac{3}{4}$ mile bank of 1 in 60. On the other side the descent is not quite so steep, and then from Luib to Crianlarich occurs about 6 miles of ground which is virtually level. Beyond, climbing again re-commences, and is continued for 6 miles, the grades being chiefly 72, 61, and 50. The second summit is attained two miles beyond Tyndrum, whence the descent continues to Loch Awe, Dalmally being approached by about five miles of 1 in 50, though the grades vary rather frequently. Hence, by the side of Loch Awe, there are stretches of level ground interspersed with ascents and descents, but onwards from the 66th mile-post from Dunblane the gradient profile assumes the likeness of a saw edge, and the slopes vary from 75 to 50. From Connel Ferry there is an ascent of $3\frac{1}{2}$ miles, virtually at 1 in 50 throughout, to Glencruitten, the third and last summit, and to this succeeds a sheer drop of $2\frac{1}{2}$ miles at 1 in 50 into the terminus of Oban.

When the arduous nature of the Callander and Oban section is fully realised, it does not surprise the reader to learn that, even in the early days of its history, special engines were built, and set apart for the purpose of working the trains over these long and terrible inclines. These engines were known as the "Oban Bogies," and were designed by Mr. G. Brittain, who occupied the post of locomotive superintendent of the Caledonian Railway from 1876 to 1882. They had outside cylinders, leading bogie, and four-coupled wheels of 5 ft. diameter when new. The four-wheeled tender was small, and held 1,550 gallons of water.

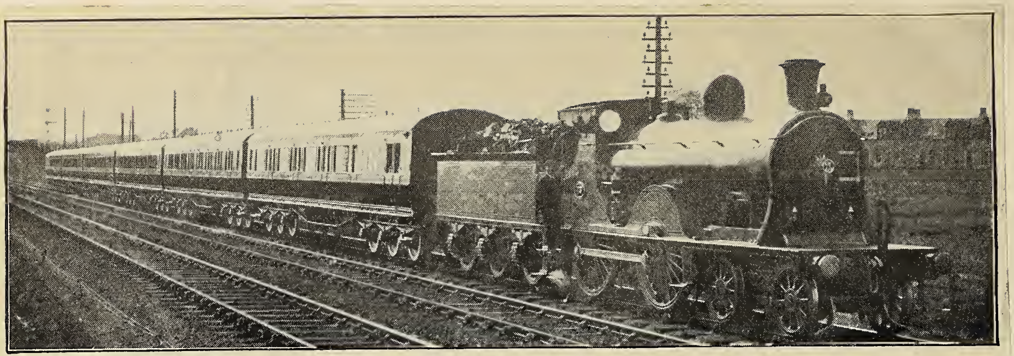
In 1902 Mr. McIntosh built some six-coupled engines for this service, and these have succeeded to the title of the "Oban Bogies," all the earlier class having been either scrapped or relegated to easier duties. The present-day tender of this particular type is still comparatively small. It is not necessary that a large amount of water should be carried, as there are no long non-stop runs to consider. It is, moreover, cheaper and easier to take water as it may be required at the different points on the route, rather than haul a heavy tender over such mountain grades, where every ton of load makes an appreciable difference to the work of the engine. A comparison of the leading dimensions of the old and new "Oban Bogies" is of interest, inasmuch as it shows how the increasing demand for more powerful locomotives has been met by Mr. McIntosh :—

	180 Class. 1876.	55 Class. 1902.
Wheels	4-4-0	4-6-0
4-wheel tender	1,550 galls.	6-wheel tender—3,000 galls.
Cylinders	18 in. by 24 in.	19 in. by 26 in.
Driving wheels	5 ft. 0 in.	5 ft. 0 in.
Heating surface	1,086 sq. ft.	1,905 sq. ft.
Boiler barrel	10 ft. by 4 ft. 3 in.	11 ft. by 4 ft. 7 in.
Pressure	150 lbs.	175 lbs.
Weight of engine and tender	65 tons 10 cwt.	94 tons 14 cwt.
Adhesion weight	27 tons 8 cwt.	42 tons 17 cwt.



Photo] CALEDONIAN RAILWAY. [*Mr. E. Devonshire Jones.*

Oban-Glasgow Train in Callander Station, 0-6-0 Locomotive No. 765.



CALEDONIAN RAILWAY.
West Coast Excursion, formed of new Corridor Coaches, each carried on two 6-wheel bogies.

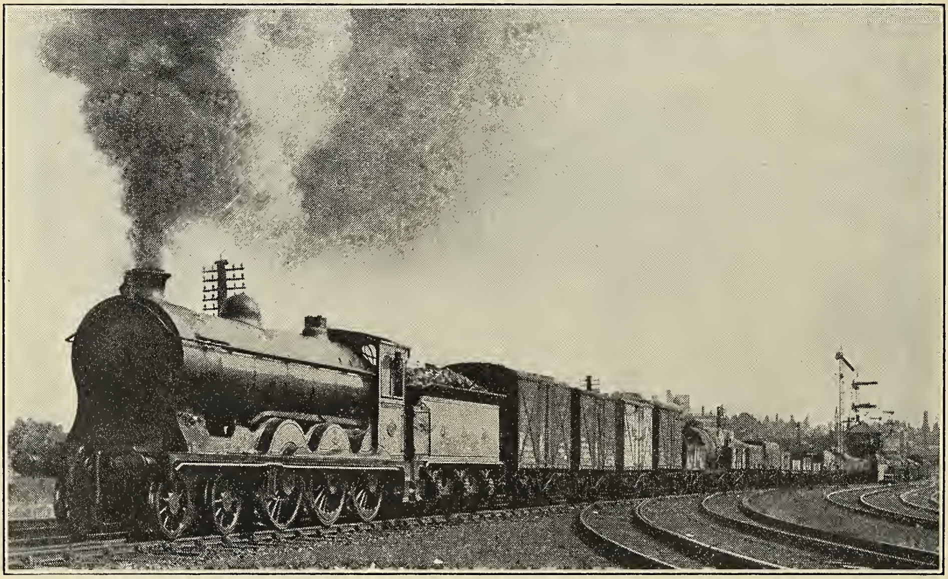
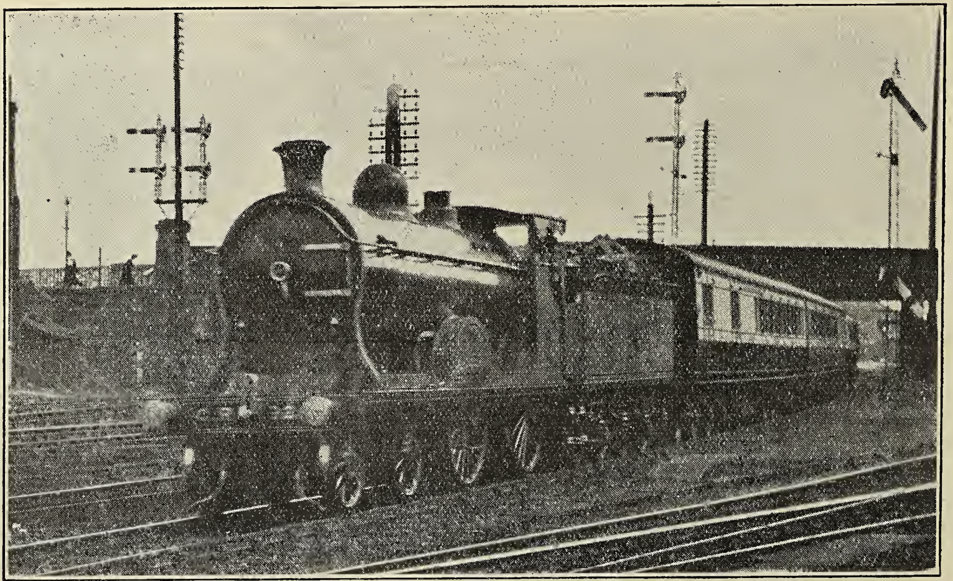


Photo.] **CALEDONIAN RAILWAY.** [*F. E. Mackay.*
Down express goods train. 4–6–0 locomotive (5 ft. 9 in. class) No. 180.



Photo] CALEDONIAN RAILWAY. [*Mr. R. A. Chrystal.*
Aberdeen express leaving Stirling, hauled by 4-4-0 locomotive.

Rambles on the Caledonian Railway:

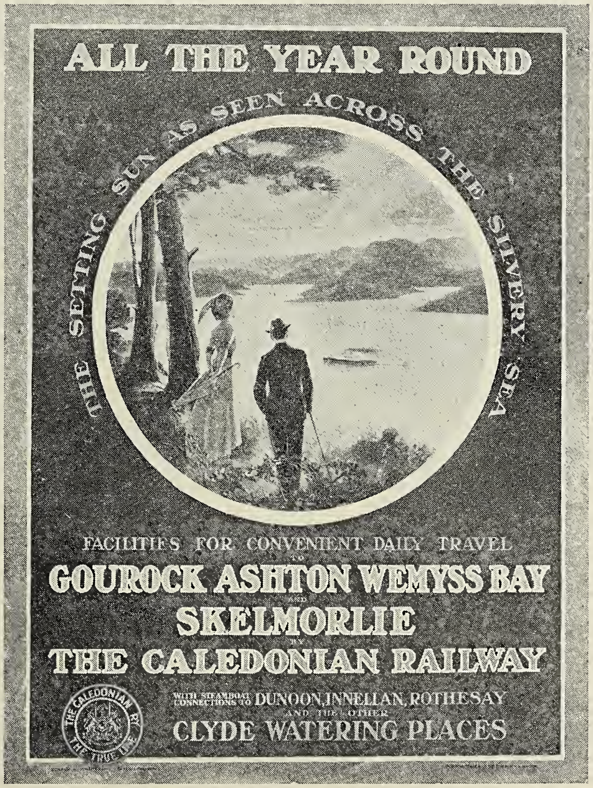
PERTH TO OBAN AND BALLACHULISH. [Concluding].

By G. W. J. POTTER.

[The first article on this subject appeared in the RAILWAY MAGAZINE, August, 1912.]

TRAVELLERS from Dundee, Forfar, Aberdeen, and the North generally are those to whom the continuation of the Perth and Crieff line through Comrie to Balquhidder has proved the greatest blessing. Tourists also have reason to be grateful, for the railway runs through charming scenery, especially in the neighbourhood of Comrie, and the ride alongside Loch Earn—sometimes at water-level and at others high up on the wooded sides of the lake—is an experience to be long afterwards remembered with pleasure. As the train from St. Fillans is climbing up the steep gradient to Balquhidder, it may happen that a train to or from Oban may be discerned high up on the mountain side. The effect is striking, as the beholder is already at a considerable elevation above ground level, as denoted by the waters of Loch Earn beneath him; and here, far above him, is a train which appears to be running on a little shelf cut out of the rock. A few minutes later he has reached Balquhidder, made the necessary change, as the junction points face away from Oban, and is himself passing over the same narrow elevated track, and looking down upon the road which he has recently travelled, admiring the beautiful panoramic view of Loch Earn which is obtained from the carriage windows. Soon the deep and narrow pass of Glen Ogle is entered, and on the opposite hillside may be seen, at different elevations, the present-day coach road, together with traces of two others, which from time to time cross and re-cross each other. The lowest is the military road constructed by General Wade more than two centuries ago, and it is to these works of his that the oft-quoted lines refer:

> Had you seen these roads before they were made,
> You would hold up your hands and bless General Wade.


ALL THE YEAR ROUND
THE SETTING SUN AS SEEN ACROSS THE SILVERY SEA
FACILITIES FOR CONVENIENT DAILY TRAVEL
TO
GOUROCK ASHTON WEMYSS BAY
AND
SKELMORLIE
BY
THE CALEDONIAN RAILWAY
WITH STEAMBOAT CONNECTIONS TO DUNOON, INNELLAN, ROTHESAY
AND THE OTHER
CLYDE WATERING PLACES
THE CALEDONIAN RY. THE TRUE LINE

The railway keeps high up on the mountain side, running at times close to the edge, then passing through clumps of trees, so that it is quite an easy matter at certain places, without any undue exertion or risk, to gather rowan berries from the carriage windows. Few pedestrians are seen, though occasionally anglers may be noted plying their rods in the streams. The chief users of the road and district appear to be motor-cars, which are usually found travelling at high speed. Distance, rather than scenic beauty, would appear to be the ambition of the majority of the owners.

At Killin Junction a short branch railway just over five miles long leads to the stations of Killin and Loch Tay, whence passengers embark on the steamer or boats plying on that well-known loch. Proceeding along Glen Dochart, Crianlarich is reached. Here the interest of the railway enthusiast will be quickened as he notes that another company's metals are in sight. Possibly also a North British train may be seen making its way to or from Fort William and Mallaig. A physical junction connects the two lines, so that vehicles may be transferred from one company to the other, but no through trains or carriages are run between the two systems. The North British crosses the Caledonian by a bridge of fair elevation, and then continues along the side of the hill in a north-westerly direction to Tyndrum, while the Caledonian takes a nearly parallel course, keeping to the southern side of the valley. The two stations of Tyndrum are as it were nearly opposite each other, but a considerable distance—possibly about two miles—apart. Having surmounted the second summit of the Callander and Oban line, at a point about a mile beyond Tyndrum, a practically continuous descent is made to the shores of Loch Awe, the railway for some little way running close beside and overhanging the waters of this beautiful loch. The rail does not follow the whole length of Loch Awe (30 miles), but keeps very near the banks of the river Awe, through the Pass of Brander, majestic in its gloom. Though Loch Awe discharges its waters into Loch Etive, geologists maintain that this is a comparatively recent outlet, and that the ancient overflow was from the southern end, and thence into the Sound of Jura.

Through the Pass of Brander, the railway runs at the foot of a steep mountain, and falls of rock and stone occasionally occur. With a view to minimise the possible danger which might threaten a passing train, the Caledonian authorities have, with characteristic forethought, provided "automatic stone signals," as they are officially termed. The posts, 14 in number, which carry these special signals are placed at suitable points where they can best be seen by the drivers, and extend over a distance of nearly four miles. Each post is provided with both an up and a down arm, and as the normal position of these arms is "off," it follows that the unusual spectacle is seen of signals showing "all right" indications in both directions over a considerable length of single line. The working of the system may be briefly explained as follows.

ALYTH JUNCTION: CALEDONIAN RAILWAY.

The signals are connected by a number of wires, forming a screen which runs along the top of the railway slope on the hill side of the line, and as long as the screen wires remain intact and unbroken the signals show clear; but in the event of a stone falling from the mountain, and one or more wires being broken, both up and down signals go to danger. As the wires are fairly close together, it is obvious that they act also as a screen, and thus detain pieces which might otherwise prove a source of danger if allowed to fall upon the track. Every alternate wire passes the first signal post, and is connected with the second signal post. Hence, should the wires be broken, there is every probability that the danger position would be exhibited at two posts' distance away in each direction. The severance of the wires also causes an electric bell to ring in the signal-box and in the houses of the watchmen and platelayers. Speed over this section is restricted to 20 miles per hour by day and 12 miles per hour at night. It will be seen, therefore, that great precautions have been taken to ensure safety.

At Taynuilt a lovely view is obtained of Loch Etive, and for the next few miles the course lies by the side of its picturesque surroundings. The widely celebrated Connel Ferry viaduct soon comes into view, and the train draws into the junction station of Connel Ferry. Oban is a little over six miles away, but the engine has now to face a continuous climb of 3½ miles—virtually all at 1 in 50—to attain the last summit. From this point there is a 2½ mile descent at 1 in 50; and, by a huge semicircular sweep—giving passengers the opportunity of obtaining a splendid panoramic view of the town and bay—Oban is reached, the train coming to rest in the station, which is situate on the quay.

Photo] [*R. A. Chrystal.*

CALEDONIAN RAILWAY TRAINS AT STIRLING.

From left to right the engines shown are: No. 734 (1st Dunalastair Class), 77 (rebuilt Carbrook Class), and No. 197.

The terminus of Oban reminds the Scottish traveller of Wemyss Bay station. In each case the long platforms lead directly to the waterside, and the outlook has somewhat of the same characteristics of wooded islands, a beautiful waterway with numerous bays and inlets, and a succession of pleasure steamers plying to and from many parts. In both places the Caledonian seems to have obtained a commanding site in quite the best part, giving the onlooker the impression that the town's prosperity is measured by the railway company's contribution and presence. The two station buildings can, however, hardly be compared, though Oban has nothing to be ashamed of. But the beautiful and graceful structure of Wemyss Bay, with its glass roof and its fine horticultural display—giving one the idea of a conservatory rather than a railway station—is probably without a rival in its own particular style and design. Again, the crowds of people using Wemyss Bay are not seen at Oban, and the accommodation there provided would seem equal to the demands made upon it at the busiest holiday times.

Several of the Scottish pleasure resorts have added, often very inappropriately, a second or descriptive title to their own names. Thus Nairn calls itself—but without any apparent reason—the " Brighton of the North," and Rothesay aspires to be the " Madeira of Scotland." Similarly, Oban wishes to be known as " The Charing Cross of the Highlands," and in a measure the claim can be justified, inasmuch as it is a port of call for all the steamers serving the western side of Scotland. It must, moreover, be remembered that communication by steamer, owing to the physical nature of the country, is still in many parts the rule rather than the exception. Often, indeed, it is the only method of travel possible. By means of the Caledonian Railway one is enabled to journey northwards to Ballachulish, eastwards to Crianlarich to join the North British for Mallaig, or to continue to the Caledonian main line at Dunblane or Perth, and thence to all parts of Scotland or England and Wales.

A few words must be devoted to the Ballachulish branch, which extends in a northerly direction from Connel Ferry, running for the whole of its course of 27 miles 54 chains almost within sight of the sea, as represented by the salt-water Loch Linnhe. Connel Ferry station is provided with an island platform on the down side, and on the up side there is a platform with a bay at each end. Besides being a terminating point for the branch trains, Connel Ferry is also the headquarters of a rail motor-car service which the Caledonian authorities have instituted between this point, North Connel (53 chains), and Benderloch (2 miles 66 chains). There are nine booked services each way on week-days, but only three of these connect with Benderloch, passengers for this place and stations beyond being accommodated by the five up and down trains which constitute the Ballachulish summer service. On Sundays—when there is no service to and from Ballachulish and Connel Ferry—the booked motor journeys each way are ten in number, and of these five run through to Benderloch.

In addition to the standing service, the company are, when required, prepared to run trips with passengers on payment of the minimum charge, and also to take motor-cars in either direction at any hour clear of the booked runs, on application being made to the stationmaster at Connel Ferry or Benderloch. The rail motor-car as used on this service runs on four wheels, and is driven by means of a 30 horse-power petrol engine. The seats are arranged in tiers, each row being slightly higher than the one in front, char-a-banc fashion, and the total capacity of the vehicle is twenty-three passengers exclusive of the driver. No provision has been made for turning the car at either end of the journey. Thus it always runs with its head in one direction; that is, in going from Connel Ferry the vehicle is running rear first, and in returning to that place the head of the car is leading.

Most readers are aware of the enormous development of motor-car travelling within recent years, and how they are found touring over all parts of the country; but it may surprise some to learn that during the summer months motor-cars are plentiful even in the wild and desolate districts of Scotland. It is no uncommon sight when journeying through the sparsely inhabited districts served by the Caledonian, North British, or Highland to pass or be overtaken by motor-cars on the road which is often visible from the railway carriage windows. Needless to say, the employment of the motor-car has led to decreased receipts for the railway companies, especially as regards the first-class fare, which is naturally the best paying section of passenger traffic. Accepting the inevitable, the railways have, therefore, endeavoured to balance matters by providing facilities for taking motor-cars by railway from point to point as may be required. The service at Connel Ferry is an apt illustration of this accommodation. There the only connection between the north and south banks of Loch Etive, besides the small, primitive, and somewhat risky ferry boat, is the railway bridge of the Caledonian. Anyone staying with a motor-car at, say, Oban or Connel Ferry, and desiring to drive to Benderloch or Glencoe, must perforce make a wide detour, and go many miles out of the direct course, inasmuch as the loch runs a long way inland and for several miles there are no facilities for crossing it.

Hence the Caledonian Company offered to solve the difficulty by conveying motor-cars across Loch Etive on a truck attached to the rail motor-car, and this method has become very popular with motorists. When at Connel Ferry I witnessed these proceedings with interest. A motor-car containing three ladies inside, one on the seat beside the chauffeur, and a considerable quantity of luggage drove up to the station. The car was placed on a carriage truck, and made secure, and the rail motor was backed down and attached. Leaving the eastern bay on the up side of the station, the motor hauled the truck out on to the main line, and the points having been properly set, proceeded to propel the car with its load of ladies, luggage, and chauffeur down the line and across the bridge.

Photo] [Tom M. L. Neish.

CALEDONIAN RAILWAY.

Blairgowrie-Dundee train passing Fairmuir Junction signal-box.

Much has been written of the Connel Ferry viaduct or bridge, which is constructed on the cantilever principle; and, though a long way behind, yet comes next to the Forth Bridge in length of span. The bridge forms a notable feature in the landscape, but an end-in-view through the bridge is even more striking.

Many of the trains on the Oban branch are composed wholly or partially of "Grampian" stock—the latest production in luxuriance and comfort provided by the Caledonian authorities. But owing to the severe curves met with on this section, the coaches are not quite the same length as those provided on the main line between Carlisle, Glasgow, Edinburgh, and Aberdeen. Some of the older types of vehicles are, of course, still in use, and there are to be found several carriages with coupé compartments at either end. To any who may not know exactly what is meant by a "coupé," it may be explained that such a compartment has seats on one side only, the ends of the coach being fitted with glass windows, which make it possible for the passenger to see the end of the coach in front or behind. Should there be no other coach in front, the engine is visible, and, incidentally, in either case a greatly increased angle of view is obtained over the country on each side of the track.

One day the passenger accommodation was somewhat limited in the Ballachulish train, and before leaving Connel Ferry two elderly ladies decided to travel—but with evident misgivings—in a coupé which was otherwise unoccupied. This was next to the train engine, one of the smaller "tanks," running bunker first. Away we went, and the journey to North Connel must upon the whole have been all right; but upon reaching Benderloch, our second stop, the ladies apparently had had more than enough of this type of railway travelling. They hurried out of the compartment directly the train stopped, and with ejaculations of "It was dreadful" and "I could not bear any more," sought refuge in another carriage. The remainder of the journey in that coupé was, nevertheless, a thing to be remembered by us. The line runs by the sea for many a mile, and the views are charming. Locomotive interest was also to the fore, as a considerable part of the work on the footplate could be watched with ease and comfort.

SNOW BLOCK AT GLENOGLEHEAD.

After travelling for some distance along the shore of Loch Creran, another arm of the sea, the line makes a curve, and, by means of the handsome Creagan Bridge, crosses the loch at a point where it suddenly narrows. A view of this bridge was given last month. At the terminus, Ballachulish (Glencoe), as distinguished from Ballachulish Ferry, the company have provided an excellent refreshment room, which is all the more appreciated in view of the fact that there is little or no accommodation of the kind to be obtained in the straggling village. From Ballachulish coaches run through the wild and solitary Glencoe—of terrible and awful memories—to Lochetivehead, whence passengers sail down Loch Etive to Ach-na-cloich, and thence by rail to Oban. Fort William, the Caledonian Canal, and Inverness may be reached by steamer from Ballachulish, and readers may be referred to the excellent series of tours arranged under the auspices of the Caledonian Railway Company.

It may be added that the whole country is full of varied charm and beauty, and that for the railway enthusiast there is much of interest. Whether this early and celebrated line be approached from Perth, Gleneagles, or Dunblane is simply a matter of choice and convenience to the traveller. But, if possible, each of the routes should be gone over, so as to obtain a comprehensive idea of the facilities that have been provided for the maintenance of an adequate traffic service to and from Oban. My thanks are due to several Caledonian officials for many services courteously rendered, and especially to Mr. Alex. Fulton (recently at Perth), but who has taken up the duties of District Traffic Superintendent at Edinburgh.

From East to West in Central Scotland.

THE LOCHEARNHEAD, ST. FILLANS, AND COMRIE SECTION OF THE CALEDONIAN RAILWAY.

THE last length in the iron road connecting the east and west coasts of Central Scotland will soon be laid, and already a sufficient stretch of new line has been brought into working to open up to the railway traveller a glorious wealth of Highland scenery, famed alike in song and story, but unknown to the eye of the tourist who needs must make his acquaintance with Nature in those places only which are accessible by railway.

The work of connecting the prosperous towns of Dundee and Perth, on the east of Scotland, with the pleasant summer resort of the west coast—Oban—is one of gradual progress. The project hastens slowly, but its name will soon be added to the long list of Caledonian Railway enterprises, under the head of “something attempted, something done.”

First came the section from Crieff to Comrie—a small extension of the Caledonian Railway. Then came authority for a new line from Comrie to Lochearnhead (now Balquhidder) station, on the Callander and Oban Railway, and though originally promoted as an independent line, it was taken up and constructed by the Caledonian Railway.

The portion from Comrie to the charming village of St. Fillans was opened for traffic in October, 1901, and an additional length of 7 miles, extending from the latter place, is now completed and was opened for traffic last month, thus leaving only 2 more miles to be laid before the work is complete.

The new railway runs along the hillside on the north of Loch Earn, and being at a considerable elevation above the loch for most of its length, very fine and extensive views are obtained from many points on the route. There are, in fact, few fairer or more magnificent views of Highland scenery than those to be obtained from either end of Loch Earn.

While the line has been carefully laid out to follow the contour of the hillside, the nature of the country has involved the construction of works of considerable magnitude in its formation, and the making of the track was no easy task.

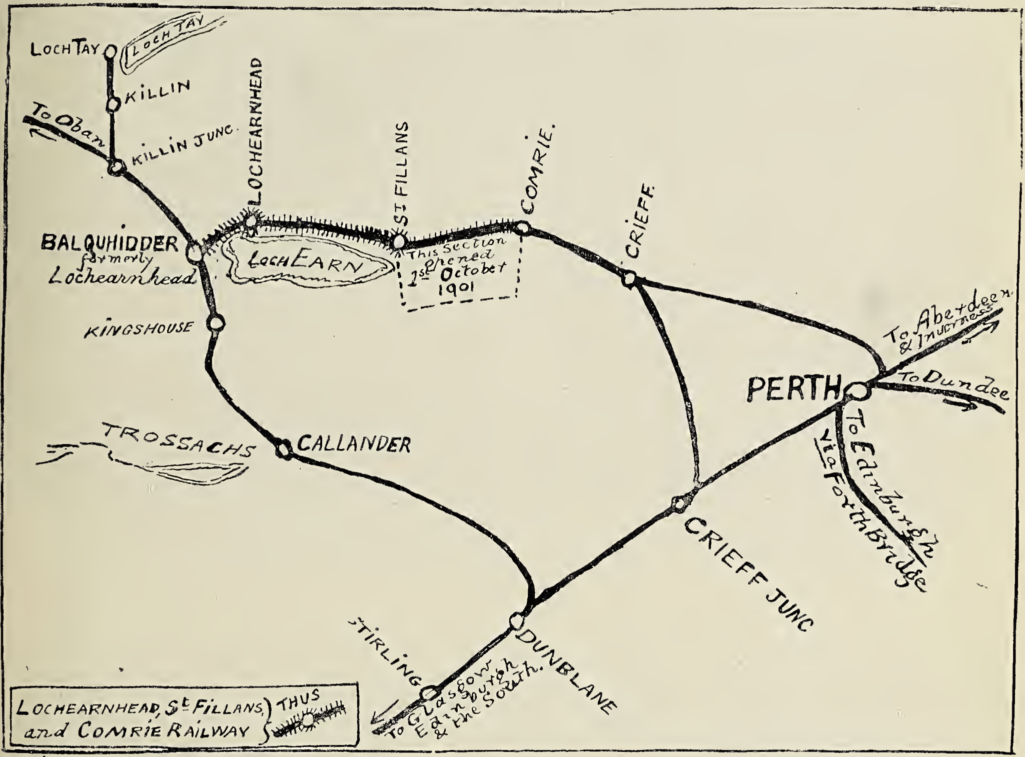
Leaving St. Fillans station, the railway crosses the road forming the approach to the station and is carried along the hillside at the back of the village. The work on the first ½ mile involved heavy rock cutting and tunnelling. The rock encountered was mostly of a schistose character, with now and again a dyke of whin. One of these whin dykes was met just beyond St. Fillans station, and proved a tough job to blast. Part of it was treated as an open cutting, while another portion of it, extending to 62 lineal yards, has been tunnelled, and the stone so obtained has formed a substantial ballast for the track.

About 1¼ mile from St. Fillans a viaduct spans a ravine in which there is a fine waterfall visible from the railway, and several other smaller ravines are crossed by viaducts in the first 2 miles, the line rising along the hillside till, about 2½ miles from St. Fillans, it reaches a height of about 130 feet above the loch, and continues at about this level for another mile.

Having provided the traveller with a splendid view of the loch for the distance mentioned, the line then begins to descend and approaches nearer to the loch. Passing through Derry Wood it continues to fall till it is only about 40 feet above the loch at the crossing of the Beich Burn, about 5 miles from St. Fillans.

From this point it again begins to climb up the hillside for about a mile, reaching an altitude of about 100 feet above the loch, and thence falling to Glen Ogle, which is crossed by a viaduct consisting of nine arches of 40 feet span each (illustrated on page 150) thence, curving round southward and crossing over the public road from Lochearnhead to Killin, it enters the station, which is conveniently situated for the village.

It may be remembered by RAILWAY MAGAZINE readers that the viaduct across Glen Ogle formed the subject of an inquiry by a Committee of Taste of the House of Commons, regarding its effect upon the beauty of the neighbourhood, and especially the view up and down Glen Ogle. Now that the embankment and viaducts are built, all who have seen them agree that they in nowise form a blot on the beautiful landscape.


LOCH TAY
LOCH TAY
KILLIN
To Oban
KILLIN JUNC.
LOCHEARNHEAD
ST FILLANS
COMRIE.
CRIEFF
BALQUHIDDER formerly Lochearnhead
LOCH EARN
This Section opened 1st October 1901
KINGSHOUSE
PERTH
To Aberdeen & Inverness
To Dundee
To Edinburgh via Forth Bridge
TROSSACHS
CALLANDER
CRIEFF JUNC
STIRLING
DUNBLANE
To Glasgow Edinburgh & the South.
LOCHEARNHEAD, St FILLANS, and COMRIE RAILWAY } THUS

SKETCH MAP.
Showing the great saving to passengers travelling from East to West of Scotland (and *vice versâ*) by the Lochearnhead St. Fillans, and Comrie Railway.

From the new Lochearnhead station the line rises all the way to Balquhidder (formerly called Lochearnhead), a distance of 2 miles, where it is to form a junction with the Callander and Oban Railway.

The ruling gradient of the new line is 1 in 60, but for considerable distances the gradients are good.

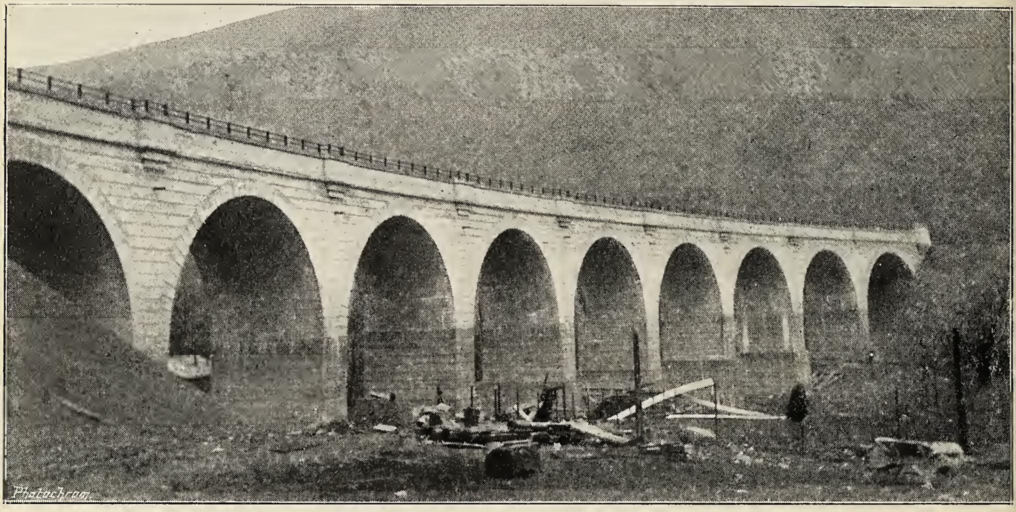
The new Lochearnhead station is a neat structure, arranged with an island platform on which the buildings are erected, providing the usual waiting-rooms and other accommodation. There is a goods station adjoining, with goods shed, loading bank, and ample siding accommodation. The portion of the line opened in July terminates at the village of Lochearnhead.

For the first 5 miles from St. Fillans the railway runs through the property of the Earl of Ancaster, and the remaining portion up to Lochearnhead village through that of the Marquis of Breadalbane.

The remainder of the line up to Balquhidder station is not yet completed, although the works upon it are well advanced. This section, it is anticipated, will be opened early in next year. In this portion of the line, which is about 2 miles long, there is a large viaduct at Edinchip, carrying the railway across the Ceanndroma water. The viaduct consists of seven arches of 40 feet span, 50 feet high, and a steel girder span of 80 feet.

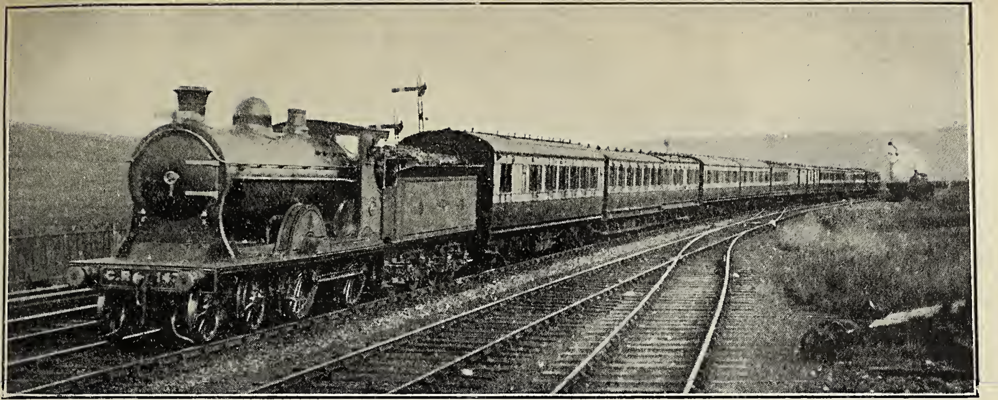
The new Balquhidder station will be about 170 yards westward from the present (the original) Lochearnhead station on the Callander and Oban line, in order to facilitate a junction of the two lines, and a lowering of the present levels is also necessary in addition to a diversion of the public road.

The completion of this railway will give the Caledonian Railway an east and west connection through the central districts of Scotland, and will afford railway facilities for travellers through one of the most beautiful districts of the country. The height of the railway as it runs along the hillside on the north of the loch is its great charm, as the traveller can at times see straight over the tops of the tallest trees to the waters of the loch, and obtain splendid views of the mountains beyond.



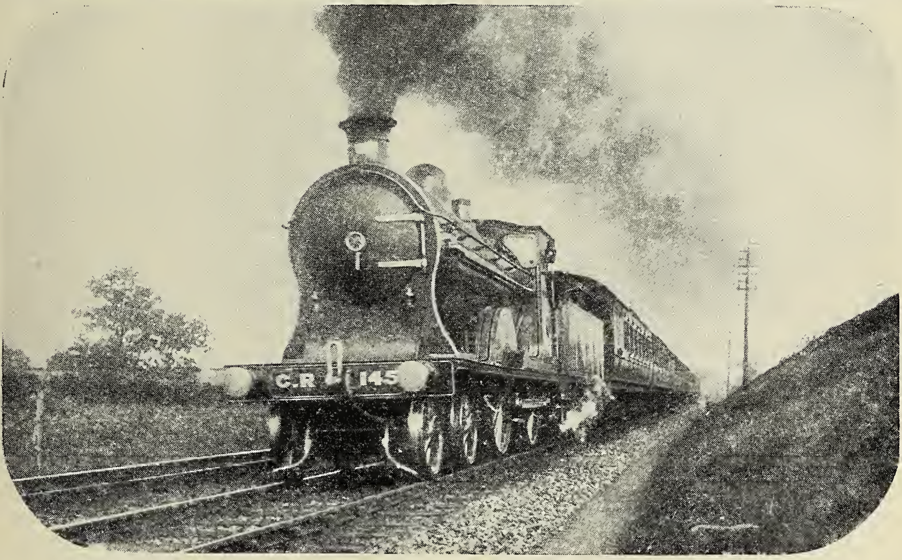
Photo] THE GLENOGLE VIADUCT ON THE LOCHEARNHEAD, ST. FILLANS, AND COMRIE RAILWAY. [*Mr. D. L. Forgan.*
(Nine spans, each of 40 feet.)

The engineers of the line are Messrs. Crouch & Hogg, C.E., Glasgow. The contractor for the railway works is Mr. William Duncan, Glasgow, and the station buildings have been erected by Messrs. P. Comrie & Sons.



Photo] CALEDONIAN RAILWAY. [*Mr. H. Gordon Tidey.*

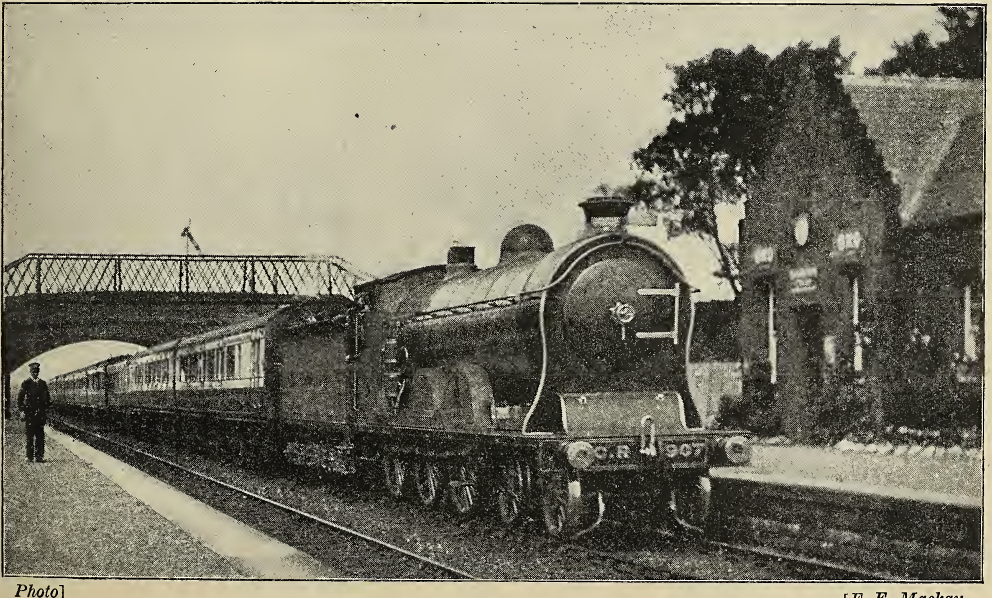
Manchester-Glasgow Express at Beattock Summit. Train engine 4-4-0 No. 143. The bank engine can be seen dropping off the rear of the train.



Photo] [*J. G. Irving.*

CALEDONIAN RAILWAY:

10 a.m. Down West Coast Express near Kirkpatrick. 4-4-0 locomotive, No. 145.



Photo] [*F. E. Mackay.*

CALEDONIAN RAILWAY.

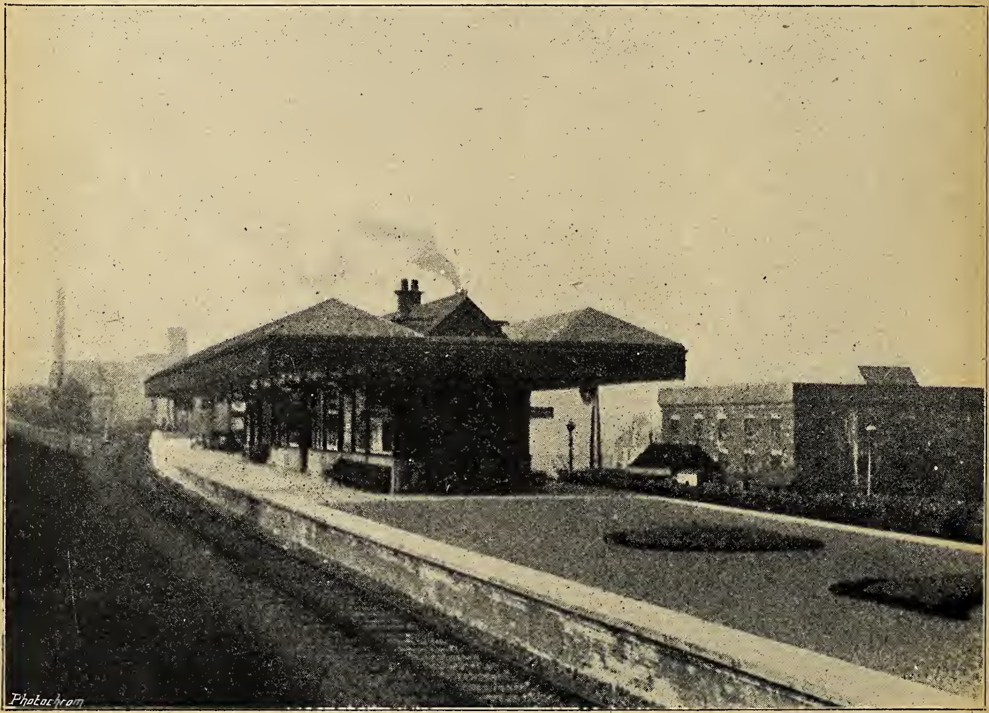
10 a.m. Glasgow to London express passing Rockliffe, 4-6-0 Locomotive, No. 907.

June

The Doubling of the Wemyss Bay Line of the Caledonian Railway.

By Arthur H. Tatlow (*Glasgow and South-Western Railway*).

IT requires no very great stretch of imagination to perceive that the Caledonian, of all Scottish railways, stands in the very forefront. It may appear somewhat misleading to refer to "all Scottish railways," when, as a matter of fact, generally speaking, Scotland only possesses five railways, viz., the Caledonian, North British, Glasgow and South-Western, Great North of Scotland, and Highland.



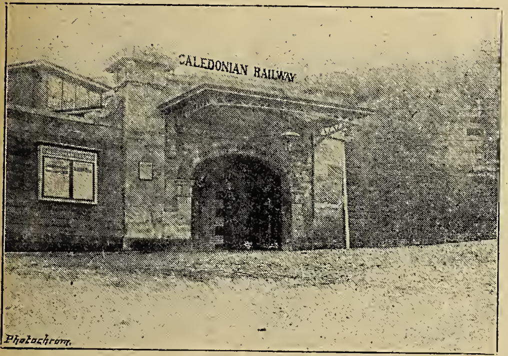
THE NEW STATION AT UPPER GREENOCK, LOOKING WEST.

The two Northern lines, from a traffic standpoint, cannot bear comparison with the Southern companies, nor, for that matter, can the Glasgow and South-Western Railway, in spite of its energy and enterprise, be fairly contrasted with the Caledonian and North-British systems, owing to its only possessing about a third of the mileage of the Caledonian Railway and a fourth of that of the North British Railway.

It is thus that the Caledonian Railway and North British Railway are the only railway rivals in Scotland to any great extent. The stories of the warfare which raged between these opponents only a few years ago—before the days of economical compromise set in—would provide matter for more than one interesting and stirring article.

There is scarcely a town of importance in Scotland at which both these systems do not touch. At Glasgow, Edinburgh, Dundee, Perth, Aberdeen, Paisley, Greenock, Dumbarton, and Balloch, to say nothing of the suburbs of Glasgow, they may be found in active and aggressive competition; and the one company scarcely moves without the watchful jealous eye of the other taking full account for future action.

But while these companies have much in common, and while their operations cover practically the same ground, notwithstanding, too, the very considerable additional mileage which the North British Railway has over its rival, the Caledonian Railway, has somehow and in some way secured in Scotland, as their allies have in England, a position of premier importance, and at the same time hold a very high place amongst the leading British lines.



EXTERIOR OF NEW STATION AT UPPER GREENOCK.

It might be interesting to enquire as to what have been the causes (for the effects are evident), contending to place the Caledonian Railway in this enviable position in the North.

Whether the explanation is to be found in the early policy which absorbed and consolidated, bit by bit, other lines, merging them into what later became the Caledonian Railway, on a safe and sound commercial basis; or the result of keenly watching the movements of their opponents, whether the North British in the North and East, or the Glasgow and South-Western Railway in the South and West, and wherever the slightest prospect of traffic development presented itself by boldly applying to Parliament for permission to enter such territory; or, on the other hand, if the cause partly be the outcome of wisely refraining from hastily putting down lines in districts where a reasonable return on outlay was not to be expected, resulting in a heavy mileage to be maintained, and burdened with the creation of unremunerative capital, a most undesirable feature, which, it is thought in some quarters, has on occasion marred the earlier policy of the North British management. Whether it is the result of any of these causes or superior organisation and control, or bolder enterprise, this article does not propose to decide. A fact, however, it is, that so far as the general but careful observer can see, the Caledonian Railway possesses the blue ribbon among Scottish railways.

Their trains, whether going north to Aberdeen, or south to London and the English provinces, are the best filled; if west to Greenock, Gourock, or Wemyss Bay, they carry the lion's share of the traffic; and if going east to Edinburgh, they book as many, if not more, passengers than their rivals the North British.

It is this restless energy, so characteristic of the general policy of the Caledonian Railway, which led it to undertake the doubling of the Wemyss Bay line.

The mention of the Wemyss Bay port is sufficient to call to mind the fierce fight the Caledonian Railway had, this time with the Glasgow and South-Western Railway, for supremacy on the Clyde.

Space forbids but a passing reference to the struggle, confining us to merely pointing out that when the Glasgow and South-Western Railway made its Greenock line, with a terminus at Princes Pier, they doubtless may have thought they had checkmated the Caledonian Railway, whose terminus seemed boxed up in the main street of Greenock. If they did think so, however, they seriously under-estimated the ingenuity and doggedness of their opponents, and were very soon to be undeceived, for in 1884 the Caledonian Railway obtained an Act of Parliament for the Gourock extension, and in 1889 the line was opened. This short extension from Cathcart Street Station, Greenock, to Gourock Pier terminus, only a little over 3 miles, cost no less a sum than £600,000, but in the making of it the company had practically to tunnel beneath Greenock, the tunnel in the west end of the town being the longest in Scotland, leaving out of account the underground lines in Glasgow.

DEEP CUTTING THROUGH THE ROCKS BETWEEN INVERKIP AND WEMYSS BAY.

Thus it was that the Caledonian Railway defeated the Glasgow and South-Western Railway at its own game, so to speak, and thereby gained a geographical advantage which it is most unlikely, although it is unwise to predict in such a case, it will ever lose.

The Glasgow and South-Western Railway, when making their line down to Princes Pier, might have continued it on to Gourock, and at a very much less cost than the Caledonian Railway, and thus have seized the coveted position, but that is doubtless now registered amongst their file of regrets. They have still a chance of partially retrieving their standing if they will continue to peg away at Parliament to allow them to make a direct line—or nearly so—from Glasgow to Largs, possibly leaving the Greenock line somewhere near Bridge of Weir, thus conserving to themselves the advantages which a quick train service to the port of Largs offers. Another, but rather improbable, contingency is that the Glasgow and South-Western might at some future date endeavour to seek powers to make a line striking off somewhere near Lynedoch (Greenock) round to the Cloch. Meantime, however, the Caledonian Railway holds the supreme position in the traffic to the watering places on the Clyde.

But while the Caledonian Railway was making this successful fight with the Glasgow and South-Western Railway for traffic on the Clyde, it was at the same time working on behalf of a private syndicate, the then existing Wemyss Bay line, the traffic on which, even in those distant days, being, for a single line section, remarkably good; on high-days and holidays heavily-laden trains from Glasgow and Paisley could be seen wending their way down to the Wemyss Bay port to connect with the boats for Rothesay, the Kyles of Bute, and Millport.

EXTERIOR OF WEMYSS BAY STATION.

About a year ago the Caledonian Railway took over in its entirety the property of the Wemyss Bay Railway, and the important undertaking of doubling the track and the reconstruction of the stations, which is now drawing to a completion, will, it is expected, be in working order for the busy, current summer season's traffic.

The Wemyss Bay branch, which leaves the Gourock line at Wemyss Bay Junction, is about 10 miles long, and passes through Upper Greenock, Ravenscraig, and Inverkip, to the terminus at Wemyss Bay pier.

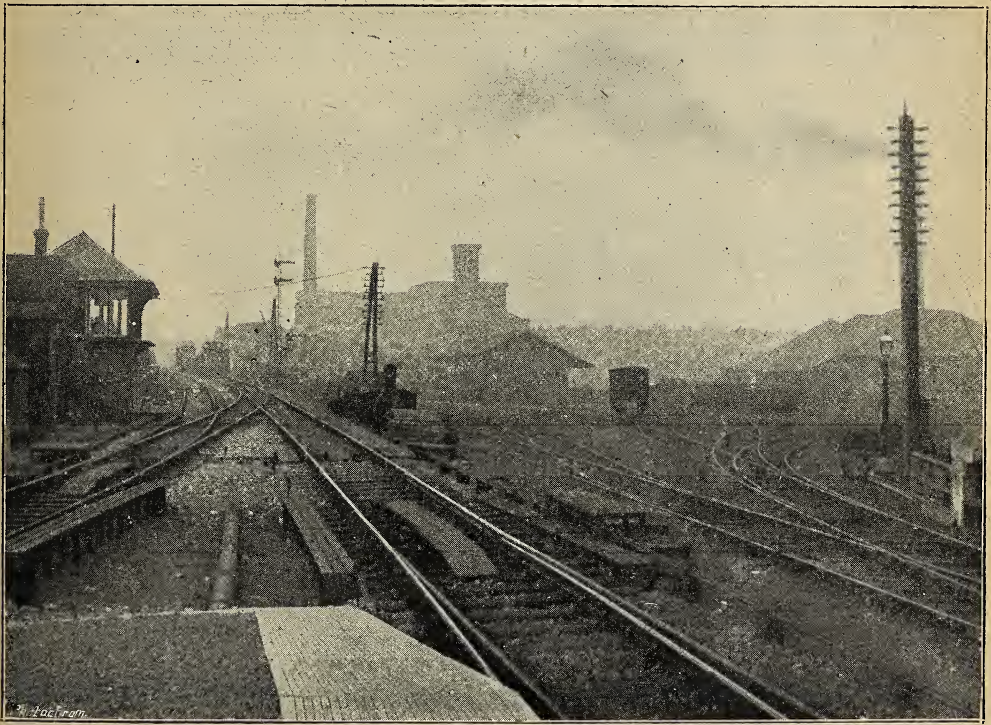
CALEDONIAN RAILWAY PIER AT WEMYSS BAY.

Although but a short line, the doubling of it—as in the initial construction—has necessitated a heavy expenditure, for the track has to climb, as well as tunnel through a deep rock cutting close by Upper Greenock Station. In doubling the line through the tunnel, instead of enlarging the present tunnel for the additional set of rails, the engineers have deemed it best to bore a separate tunnel, parallel, of course, to the old one.

A heavy piece of work, too, is the making of the viaduct at Shieldhall Glen, which is adjacent to an old Roman bridge, still in good repair.

The summit of the Wemyss Bay branch is reached close by Murdieston Farm, about half a mile from Upper Greenock Station, it being a quick rise from Port Glasgow to Murdieston, after which it is a gradual fall down to Wemyss Bay.

The station at Upper Greenock has been completely remodelled in a sub-



VIEW FROM WEST END OF UPPER GREENOCK STATION SHOWING THE DOUBLING OF THE WEMYSS BAY LINE.

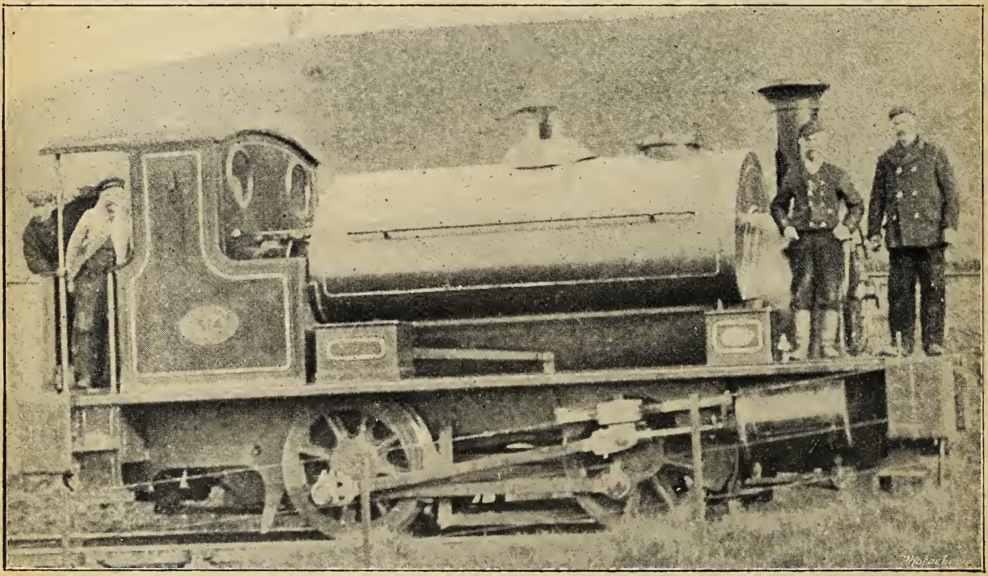
stantial, as well as artistic, manner, and a covered way provided, opening up a fresh access to the eastern side of the town of Greenock, with a considerable saving in walking distance, and at the same time placing the Caledonian Railway in a more favourable position in regard to the Glasgow and South-Western Railway competition at Lynedoch.

The station at Wemyss Bay is being added to, and will be a little nearer the pier than hitherto; the trains will not, however, be able to run alongside the boats, as at the curve pier at Gourock, the line approaching almost at right angles to the pier.

A not uninteresting feature of the Wemyss Bay branch is a small off-shoot line, about a mile long, from Upper Greenock, ascending with a gradient in places of 1 in 17. A special engine (illustrated above) works the sidings, taking only two trucks at a time. The objective of this branch is to serve the Overton Paper Mills, from which a large traffic is regularly despatched.

Those not quite familiar with the geographical position of the Wemyss Bay line, or the extent of the traffic passing over it in the summer months, may be inclined to express surprise at the expenditure the Caledonian Railway have gone to in doubling the line. A glance, however, at a map of the Clyde resorts will show what a strategical point Wemyss Bay is on the coast for the important Clyde watering places.

It must be borne in mind that in the natural course of events the bulk of the Clyde coast traffic will most likely go to that company which can offer the most frequent and the fastest service of train and boat connections. In order that the throughout distance may be covered in the shortest possible time, it is essential that as large a proportion possible of that distance should be traversed by rail rather than by water, in so far as the train can travel faster than the boat. It is in this respect, therefore, that the Wemyss Bay route—stretching, as it does, further down the Firth—has the advantage over the North British at Craigendoran, and the Glasgow and South-Western at Princes Pier, or even the Caledonian line to



No. 514, CALEDONIAN RAILWAY, THE 4-WHEELS COUPLED SADDLE TANK, USED FOR WORKING ON THE 1-IN-17 GRADIENT.

Gourock. From Wemyss Bay to Rothesay and the Kyles of Bute—the heart of the Firth of Clyde—is almost a straight line, and for the Greenock people, at least, it is the most convenient port to embark for Millport.

With the doubling of the line completed, the management of the Caledonian expect to be able to reduce the present timing between Glasgow and the Clyde ports of call by at least 15 minutes, if not more, and reduce to a minimum the vexatious delays inseparable from single line working, rendered all the more difficult when boat connections have to be made.

The vision of a 15 minutes' reduction in the hitherto express service to Rothesay, via Wemyss Bay, opens up fresh fields of conjecture as to the attitude which will be adopted by the opposing railways, for it is not to be expected that they will stand idly by and see traffic taken from them without putting forth some effort to retain a hold on the traffic preserves of Rothesay and its environments.

It will be somewhat surprising if the Caledonian Railway's influence is not evidenced in the timings of the coast trains in the ensuing season by both the Glasgow and South-Western and North British routes.

One is inclined to think that the Caledonian Railway has yet one other matter to give effect to in order to make their programme complete and their position secure, and that is to follow the examples of the Glasgow and South-Western and North British Railways and become in name and reality the owners of the boats—at present sailing under the auspices of the Caledonian Steam Packet Company, but practically subsidised by the railway company—with which they make their train connections, and, as opportunity presents itself, to replace and supplement the present steamers by the most up-to-date vessels, both as regards speed and equipment, that the Clyde builders can turn out.

In the meantime the Caledonian Railway holds the geographical advantage at Wemyss Bay, and, only in a less degree, at Gourock, and the history of that prosperous undertaking is a sufficient earnest that they know how to conserve and make good use of a position they have had to fight hard and pay dearly to acquire and equip.

It is only in accordance with the fitness of things that the services for travelling to and from the coast should progress with the times, and the Caledonian Railway, in advancing the interests of the travelling public, may find that it is, after all, the likeliest way of also furthering the interests of their proprietors.

Photo] CALEDONIAN RAILWAY. [*R. A. Chrystal.*

Aberdeen Express leaving Bridge of Allan. Locomotive No. 888.

The London Midland and Scottish Railway in Renfrewshire.

By **F. A. PLANT.**

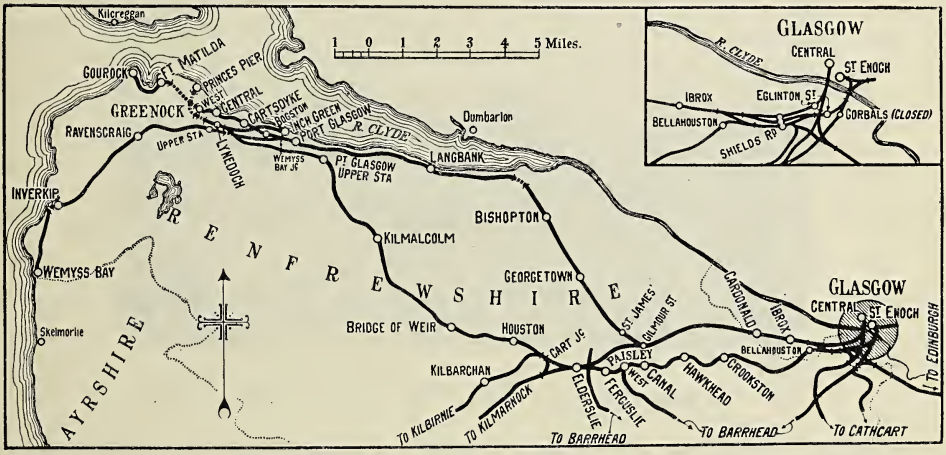
RENFREWSHIRE, although not a very large county, has yet some railway routes of more than local importance, and it is with these that this article is concerned. The lines to be dealt with are: Glasgow to Gourock and Wemyss Bay and Glasgow to Greenock (Princes Pier). Although part of the section of line between Glasgow and Paisley is outside Renfrewshire, yet, owing to the nature of the train services, a beginning must be made at Glasgow.

As regards the history of the lines concerned, the following notes may be given. The line, which ultimately became the Caledonian, was opened from Glasgow as far as Greenock (Central) in 1841. In 1865 the Wemyss Bay Railway was opened, and in 1889 the Greenock Railway was extended to Gourock. Two decades previously, in 1869, the Greenock and Ayrshire Railway of the Glasgow and South Western Railway had been opened. In 1903, part of the Wemyss Bay line was doubled.

Trains on the Glasgow to Gourock service start from platforms Nos. 12 and 13 in the Central Station, platform 11 being also used at times. After crossing the Clyde, and leaving the lines to Eglinton Street Station and beyond, we see carriage sidings on our left and the line from St. Enoch descending on the same side. Then comes Shields Road Station, with 3 platforms and 4 lines, 2 for each section. A little farther on, the St. Enoch lines join the Central lines, and four tracks ensue, the centre two for fast traffic and the outer two for slow traffic and goods trains. Soon we pass Ibrox, which has platforms on the outer lines only. Cardonald, a little farther on, is practically a wayside station (although new houses are fairly numerous), with platforms on the outer tracks only, as in the case of Ibrox. After this, scarcely any building, unless an occasional farmhouse, is seen until passing Arkleston signal box, when signs of approaching civilisation manifest themselves and soon we reach Paisley (Gilmour Street). This is a very busy station, with a double track for each section.

Beyond Gilmour Street we turn in a north-westerly direction and pass Paisley (St. James), a small station serving an outlying part of the town, which, by the way, has a population of over 80,000 inhabitants and is the county town of Renfrewshire. A few minutes brings us to Georgetown (formerly Houston) Station, which serves a small village. During the Great War there was a munition factory close by, and vestiges still remain of the sidings which existed at that time. The next station is Bishopton, a small town popular with Glasgow and Paisley business men as a place of residence. The station is neat and well kept, having various rockery and horticultural effects.

About a mile beyond Bishopton there are two tunnels, separated by a distance of about fifty yards. A cutting ensues, on emerging from which a fine view may be had of the town of Dumbarton, on the opposite side of the river, and of the famous Dumbarton Rock. Passing the next station, Langbank, which serves the village of that name, the railway runs not far from the water's edge until the approaching signs of industrialism are seen in the shape of shipbuilding yards ; then Port Glasgow Station is reached. This is a well-kept and neat structure, with a bay on the down side for local trains to Gourock and Wemyss Bay. A little farther on the Wemyss Bay lines go off and climb on a gradient of 1 in 70—but of this more anon. On the right there are shipbuilding yards and somewhat dingy houses, but these are left as Bogston Station is reached, but re-appear before Cartsdyke, the station for the James Watt Dock. After a short run, the railway reaches Greenock (Central), a handsome and spacious structure, with a bay on the upside for mail vans, &c. As its name implies, this station serves the more central parts of the town, the residential districts being served by Greenock (West), a somewhat abbreviated and dingy station in a cutting, the line between the two being either in cutting or in tunnel. After proceeding for over a mile in tunnel, the line curves sharply to the left to reach Fort Matilda, a neat little station serving the west end of Greenock and the east end of Gourock. Immediately beyond, a fine view of Cardwell Bay, Kilcreggan, Loch Long and other places can be had. The line now falls and, after a gradual turn to the right, Gourock Station is reached. This has four platforms, arranged in a rather curious manner. No. 1 is a very long platform, Nos. 2 and 3 are somewhat shorter, while No. 4 is but of moderate length, having only room for about eight coaches. No. 1 is used for most arrivals and some departures, No. 2 for some of either type, but mainly for departures, No. 3 is the main departure and deals with a few arrivals, while No. 4, which is not much used, deals only with departures. Owing to the amount of traffic, capacious sidings exist on the landward side, while on the other side is the pier, which can serve four pleasure steamers with ease.



SKETCH MAP SHOWING GLASGOW-GREENOCK, GOUROCK AND WEMYSS BAY ROUTES.

The railway steamer services from Gourock, as also from Greenock and Wemyss Bay, with those of the L.N.E.R. from Craigendoran, have been considered in various earlier articles, while the present issue contains an article dealing with the Clyde and Hebrides steamer services generally.

Beyond Port Glasgow, as mentioned previously, the Wemyss Bay line branches off and climbs at 1 in 70, giving a fine view of the Clyde and the distant hills. Soon the old Glasgow and South Western line to Greenock appears on the left, going down on a grade of 1 in 70 in the same direction, and beneath it the Wemyss Bay line plunges into a tunnel, on emerging from which it soon reaches Upper Greenock Station, a long island platform. Still on the same grade the line becomes single, but soon it becomes more level, the line passing through the modern southern district of Greenock.

The scenery is pleasant as the train passes Ravenscraig, a platform at which a few trains stop, and soon the line becomes double and, passing over a lofty bridge, drops sharply into Inverkip Station, where formerly tickets were collected. Inverkip is a small village, but is very busy on Saturday afternoons during the summer. After leaving here, the train enters a single-line tunnel (there are separate tunnels here for up and down trains) and on emerging from this a fine view of the Clyde is obtained. The line now falls sharply through a cutting, the maximum grades being 1 in 66½ and 1 in 68, and finally enters Wemyss Bay Station. This is one of the

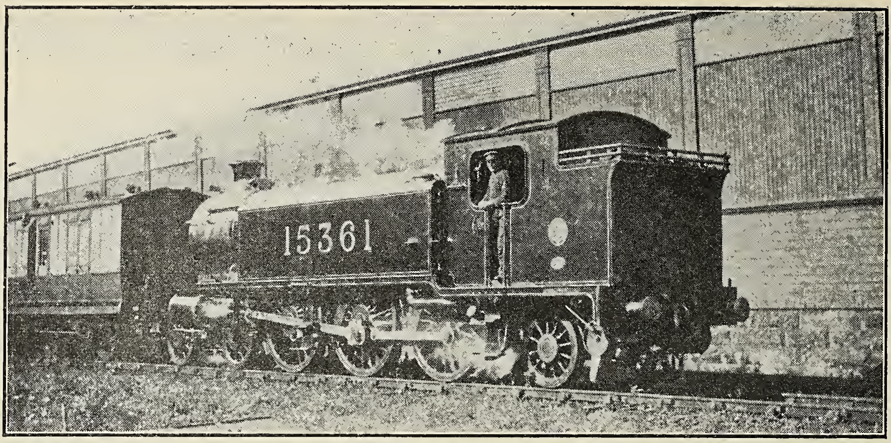


Photo.] 4-6-2T No. 15361 AT WEMYSS BAY. [*C. J. L. Romanes.*

Photo.] [*J. F Gairns.*

L.M.S. STEAMER "DUCHESS OF ARGYLL" ON THE CLYDE.

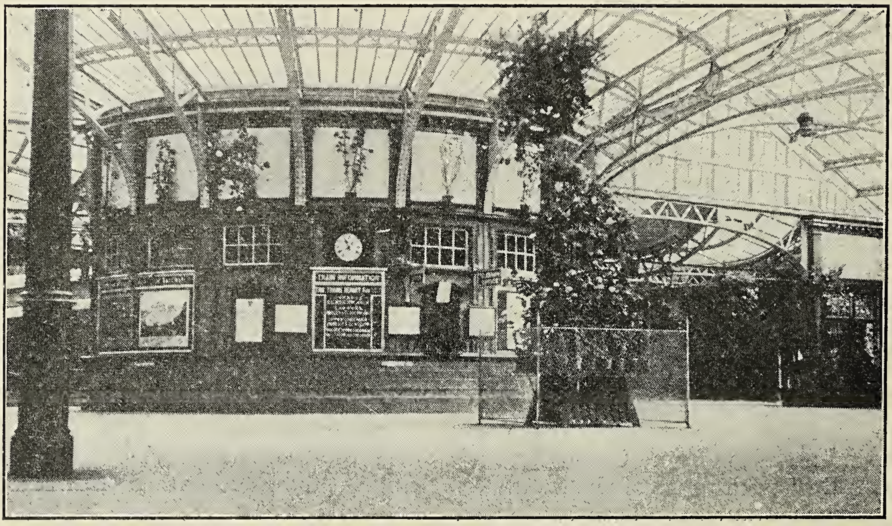


Photo.] BOOKING HALL, WEMYSS BAY STATION. [*J. F. Gairns.*

finest stations of the late Caledonian Railway and is very well kept, while hanging floral baskets are a notable feature. A broad covered passage leads down to the pier for the steamers to Rothesay, Millport and other resorts. There are two platforms, each being double-faced, No. 4 being nearest the Firth. Between Nos. 2 and 3 there is a middle line for allowing the engine to back out, as there is no regular shunting engine employed. The station serves Wemyss Bay and Skelmorlie, but the great majority of the traffic is for embarkation.

As regards the line to Greenock (Princes Pier) the trains start from Glasgow (St. Enoch) Station. No. 7 platform is possibly the most generally used, but several others are also employed. The lines from all platforms, after curving sharply to the right, converge into four lines across the bridge. A pair of lines goes off on the left through Gorbals Station (now closed), which forms the main line to Kilmarnock, Dumfries, Carlisle and beyond. Four lines proceed through Cumberland Street, two of which fall in a curve down to Shields Road, that is, the station adjacent to the Caledonian lines, while the other two proceed to Shields Road, formerly known as Shields, which is about one hundred feet apart from the other station. The former pair of lines shortly after join the Caledonian lines, as previously described, leaving them just before Gilmour Street Station. They then proceed to Elderslie. The latter, on leaving Shields Road, proceed quite near to, but on a higher level than, the Gilmour Street lines, and then, passing carriage sidings, come to Bellahouston Station, the up side of which is backed by carriage sheds. After that, in succession, come Corkerhill Engine Sheds, Corkerhill Halt and Crookston Station, in a district studded with new houses. Soon comes Hawkhead, which serves the eastern part of Paisley, followed by Paisley (Canal) an important station. Further on is Paisley (West), which is the terminal point for local suburban services from Glasgow. Soon after, the lines from Gilmour Street come into view and the two routes join. The line just described is notable for its sharp curves, some of which are very uncomfortable at any considerable speed.

Beyond Elderslie, the Greenock lines leave the main lines and fall fairly sharply until the lines to Kilbarchan, Kilbirnie and beyond (the alternative route to Largs, Ayr, &c.) branch off; then the line begins to climb and passes Houston and Crosslee, a country station. Still climbing, although with occasional level stretches, the line, passing through pleasant rural country, reaches Bridge-of-Weir (for Ranfurly), a busy residential little town with a well-kept station. Then follows a rather dreary climb to Kilmacolm, a high-class residential resort on high ground, with a fine glass-roofed station. The railway now commences a climb of about three miles on a grade of 1 in 100, through hilly and rather deserted country, the main road being quite near for some distance ; just after the down-hill run is commenced, Upper Port Glasgow, which consists of a goods platform, a siding or two and a signal box, is passed. Then a magnificent view of the Clyde and Port-Glasgow, lying farther down the hill, is obtained as the train curves in and out following the contours of the hill, the maximum speed being about 75 miles per hour. The train crosses a lofty ravine on a viaduct, and on nearing the southern portion of Greenock the brakes are applied gradually. Meanwhile, the Wemyss Bay line is passed on the right, but it crosses underneath as the Greenock line plunges into several tunnels in succession, finally reaching Lynedoch Station, built on a fairly sharp curve, the speed for down trains not stopping being 30 m.p.h. Tickets are collected at this station, which serves the business district of Greenock. Thereafter a short run through tunnels on a sharply falling grade brings the train to Greenock (Princes Pier Station)—the main thoroughfare of the town being crossed just prior to entering the station.

This is a fine structure possessing four platforms, No. 2 being down platform, No. 3 being main up, No. 4 local up, and No. 1 occasionally for trains of a special nature either way. The days of its glory are past, however, except on Saturdays during the summer, when special trains are run in connection with transatlantic liners. A covered passage and a stairway lead to the steamers for Dunoon, &c. Another covered passage has been fitted up for examination of emigrants. Fairly extensive carriage sidings and a large goods yard are both located on the eastern side of the station.

All the routes in question carry heavy train services throughout the year in view of the residential traffic which has grown up around them, at certain intermediate stations and at Wemyss Bay and Gourock, and the fact that these routes provide an all-the-year-round means of reaching Dunoon, Rothesay and other places which cannot be served without water transit across a section of the Firth of Clyde. During the summer months, however, these services have to be very considerably extended, involving quite a number of more or less fast trains connecting not only with the railway steamers but also with the various other steamer services plying on the Firth of Clyde. Obviously, therefore, to review the train services in close detail would take up a great deal of space, so that remarks in regard thereto must be confined to a few general comments and notes as to more interesting services. These remarks are based upon the August, 1930, train services as representing the high-water mark.

As so many of these trains are designed to feed particular steamer services, including landing stage calls at Greenock, Gourock or Wemyss Bay (sometimes two or even all three of them), there are several series of fast trains in connection with the steamers. Thus, on the Glasgow (Central) and Gourock route there are trains, making not more than four intermediate calls, at 6.0, 8.20, 8.35, 10.40 (Saturdays only), 11.6 a.m. and 12.5 p.m. (Saturdays only), with five other slightly slower or stopping trains. On Saturday afternoons the most important trains are the 1.5 p.m., which runs right through from Glasgow to Greenock (West) before serving Gourock, and the 1.15 p.m., which calls at Paisley only for the throughout journey, the first of these being a " No Luggage Allowed " train, in the sense that the steamers will not wait for luggage transfer. Other more or less fast trains are the 12.47, 1.20, 1.58, 2.25 (fast to Greenock (Central)), and 2.40 (Paisley only to Gourock) p.m. On days other than Saturday there are good trains at 12.50 and 2.10 p.m. The later afternoon services include the 3.0, 4.0, 5.6, 5.20, 6.10, 6.30 (Tuesdays, Wednesdays and Thursdays only) and 6.45 p.m. trains, some of which run on Saturdays as well as other weekdays. Provision is also made for late trains at 10.22 (Saturdays only), 10.40 and 11.15 p.m., though these are mainly for residential traffic. In the opposite direction, principal interest attaches to the 7.45, 8.8 (Mondays only), 8.15, 8.42 and 10.30 a.m. morning trains, some designed more particularly for residential traffic on the mainland, others ranking principally as boat trains. A steady series of other more or less fast trains is spread over the day, including several which do not stop between Gourock and Paisley and some which are definitely announced as dependent upon the running of particular steamers.

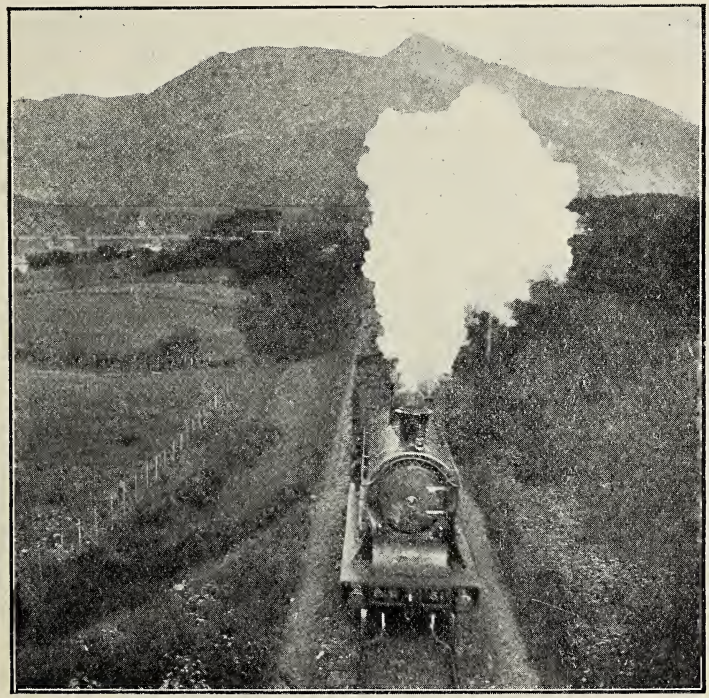
An interesting feature is the fact that on Sundays there are trains from Glasgow (Central) at 8.30, 10.5, 10.50 and 11.0 a.m., and at 1.0, 1.45, 2.5, 3.0, 4.10, 5.0, 5.20, 6.30, 7.0, 7.20, 7.45, 8.30, 9.10 and 10.0 p.m., all except three calling only at Paisley, Port Glasgow and the two Greenock stations, while the exceptions—the 10.50 a.m. and 2.5 p.m.—run right through from Glasgow to Gourock, a schedule which is not found in the weekday service at all. In the opposite direction there are, of course, equivalent trains, though somewhat differently arranged to suit the altered features of traffic, the non-stop trains leaving Gourock at 6.15, 7.48, 8.23 and 8.55 p.m.

On the Wemyss Bay route there is a similar generous service of trains, with non-stops at 11.55 a.m. and 1.10 p.m. on Saturdays, and several calling only at Paisley or at Inverkip in addition. Here, also, the services vary considerably as between Saturdays and other weekdays, the restriction " No Luggage Allowed " appears in regard to certain trains, and the running of one or two trains is contingent upon the steamer connections. In the opposite direction there are two trains shown to make the throughout journey without intermediate stop, the 8.32 a.m. (Mondays only) and the 5.12 p.m. (Saturdays excepted), with quite a number which make one, two or three intermediate calls only. There are no Sunday trains on this route.

Between St. Enoch Station and Greenock there are certain similarities with the Glasgow (Central) and Gourock trains, but not quite to the same extent. There are, however, trains which make one call only, usually at Paisley, from St. Enoch at 8.5 a.m., 1.43 (Saturdays only) and 4.3 p.m., with corresponding trains in the return direction from Greenock at 8.18 and 9.5 a.m. In both directions a number of other trains make a few calls only, and although there are no throughout non-stops there are several instances where stations other than Paisley constitute the only intermediate calls. Certain of these trains also have restrictions in regard to the conveyance of luggage and due to steamer connections. There are no trains on this route on Sundays.

On all these services trains are frequently very heavy, though, in the main, good modern stock is provided for them, including in some instances coaches built specially with a view to this traffic. On the occasion of special holidays in Glasgow, even the generous facilities indicated prove quite insufficient, and it is necessary to run numerous additional trains, a need which sometimes arises even on ordinary summer Saturdays and Mondays.

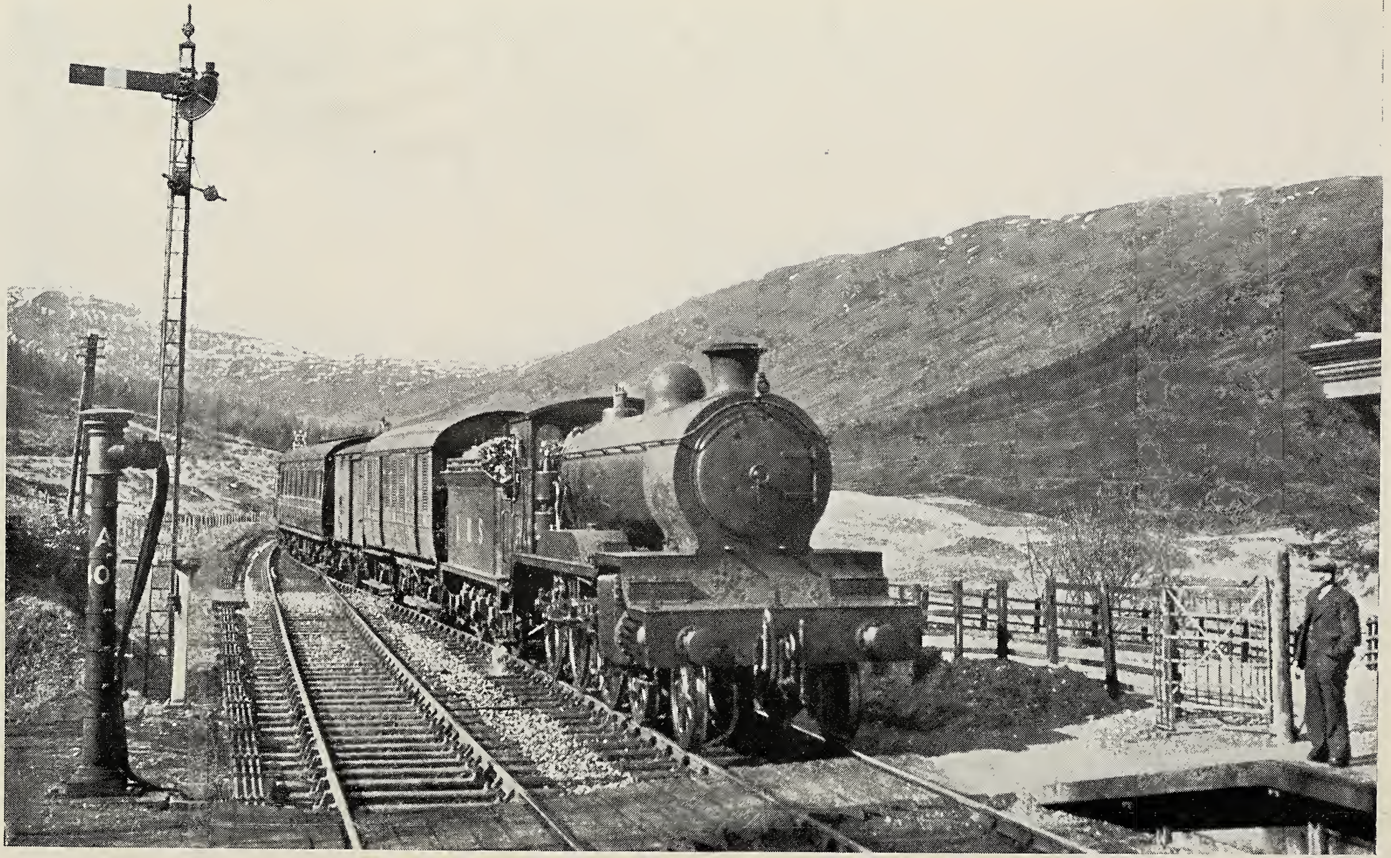
To follow the services in detail would, of course, involve a study of the steamers with which connection is made, but that is another subject, though reference may be made to an article published in January and March, 1926, issues of THE RAILWAY MAGAZINE, when the Clyde steamer services and the train services in connection were systematically reviewed.



Photo] [*Lieut. B. D. Holberton, R N.*

CALEDONIAN RAILWAY.

Glasgow-Oban train near Taynnelt, 4-6-0 locomotive, No. 51.



Oban—Glasgow train at Tyndrum, L.M.S.R.
Caledonian 4-6-0 locomotive No. 14620
(*From a photograph by John M. Miller*)

Photo.] [*H. Gordon Tidey.*

GLASGOW–ABERDEEN PULLMAN CAR EXPRESS PASSING LUNCARTY.
Caledonian 4-4-0 No. 14451.

The Perth-Dundee-Montrose Section of the L.M.S.R. [No. I.]

By J. F. GAIRNS, M.I.Loco.E., M.Inst.T.

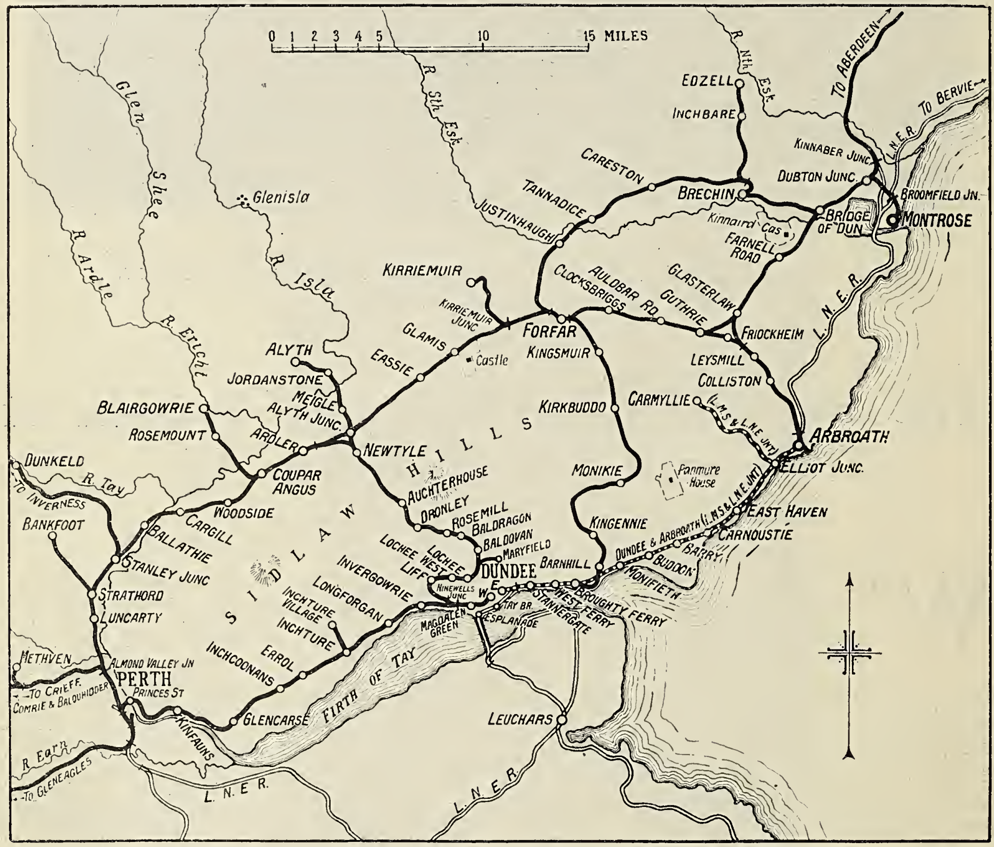
WHILE the Perth–Aberdeen section of the L.M.S.R. is probably generally familiar to many readers, it is likely that but few, other than those who have had occasion to travel extensively in Scotland, have realised the many interesting features associated with the relatively complex system of L.M.S. lines in the Perth–Dundee–Montrose area. Further, apart from the fact that the district concerned is provided with a remarkably complete system of branch and other lines, the train services are associated in a way which is unusual for what is, after all, mainly an agricultural district, though it includes several fairly large or important towns (Perth, Dundee, Arbroath, Forfar, Brechin, Montrose, &c.), while the trains are inter-worked to a notable degree. Reference to the map reproduced overleaf will show that between Perth and Forfar there are no fewer than eight junctions: Almond Valley (1 m. 52 ch.) for the Methven and Crieff branch; Strathord (5 m. 12 ch.) for the Bankfoot Light Railway; Stanley (7 m. 18 ch.) for the Highland section; Coupar Angus (15 m. 68 ch.) for the Blairgowrie branch; Ardler Junction (19 m. 29 ch.) for the Newtyle (and Dundee) branch; Alyth Junction (20 m. 42 ch.) for the Alyth branch; Kirriemuir Junction (29 m. 52 ch.) for the Kirriemuir branch; and Forfar South (31 m. 65 ch.) for the Brechin branch.

Further, beyond Forfar there are: Forfar North (32 m. 55 ch.) for the Broughty Ferry and Dundee branch; Guthrie (39 m. 54 ch.) for the Arbroath line; Bridge of Dun (47 m. 74 ch.) for the Brechin branch; Dubton (50 m. 47 ch.) for the Montrose branch; and Kinnaber (51 m. 65 ch.), where the L.N.E.R. main line joins.

Somewhat curiously, with all this array of junctions in 52 miles, in the remaining 38 miles to Aberdeen there is not a single junction or branch until the connection with the Deeside line of the late Great

North of Scotland section of the L.N.E.R. at Ferryhill, 51 chains only from the Joint station at Aberdeen. Over the Kinnaber–Aberdeen section, L.N.E.R. as well as L.M.S. trains work, the former by virtue of long-standing running powers over what used to be the Caledonian Aberdeen main line.

Returning to Perth, we find first the Perth–Dundee line, which at Ninewells Junction, near Dundee, connects with the modernised Newtyle line. The latter, at Newtyle, divides to join the main line at Ardler Junction for the Blairgowrie services and at Alyth Junction for the Alyth branch. There is no direct connection at Dundee between the West and East stations, though there are street tracks still used to a slight extent, and for interchange traffic running powers are exercised through the Tay Bridge station of the L.N.E.R. The East station is actually part of the Dundee and Arbroath Joint Line, and is used by Dundee and Arbroath trains on Joint Line service and by L.M.S. trains for Forfar which leave the Joint Line at Broughty Ferry Junction. The system under review is completed by the Arbroath–Guthrie line (L.M.S.R. only), and the Montrose, Brechin, Edzell, and other branches either already referred to or associated with those mentioned.



SKETCH MAP OF L.M.S.R. LINES IN DISTRICT COVERED.

A few historical notes will now be in place. The modern Caledonian Railway was formed by the amalgamation in 1865–66 of the original Caledonian Railway with the Scottish Central and Scottish North Eastern Railways. The latter railways incorporated other companies, and, taking into account leases and other arrangements, the system of lines under review was built up in the manner now to be described.

The Scottish Central Railway provided the route from the south as far as Perth. There connection was made with the

Scottish Midland Junction from Perth to Forfar, and with the Dundee, Perth and Aberdeen Junction, which provided the Perth–Dundee section. The Dundee, Perth and Aberdeen Junction had already leased the Dundee and Newtyle, one of the oldest lines in Scotland, having been in use as far back as 1831 (using horse-power and cable-operated inclined planes, and steam locomotives from 1837). The Dundee, Perth and Aberdeen Junction was not, however, fully vested in the Caledonian Railway until 1881, while the Dundee and Newtyle retained its individuality until grouping in 1923.

At Forfar, the Scottish Midland Junction joined the Arbroath and Forfar, which at Guthrie connected with the Aberdeen Railway, which completed the route thence to Aberdeen. Actually, the Aberdeen Company leased and worked the Arbroath and Forfar. In 1856, the Scottish Midland Junction and Aberdeen Companies became the Scottish North Eastern, while the Dundee, Perth and Aberdeen Junction and the Dundee and Newtyle were taken over by the Scottish Central in 1864, thus paving the way for the amalgamation of the Scottish Central and Scottish North Eastern in 1865 and with the original Caledonian in 1866.

The Dundee-Perth line was opened in 1847, and the Perth-Forfar line in 1848, while the Forfar-Aberdeen line, with the Guthrie-Forfar section (opened 1839), completed the route for throughout traffic in 1850. The Bridge of Dun-Brechin and Dubton-Montrose lines were part of the Aberdeen system. The Arbroath and Forfar was another line which retained its separate constitution until grouping.

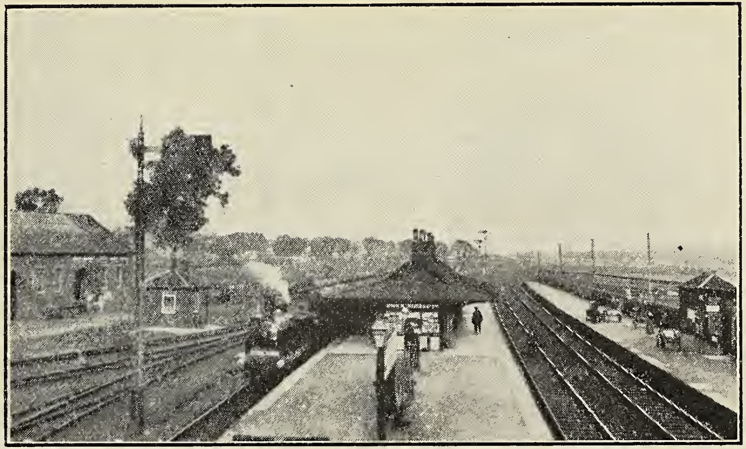
The Dundee and Arbroath line was opened in 1840, was leased to the Dundee, Perth and Aberdeen Junction in 1847, and became a joint line, after several intermediate stages, under the North British (Dundee and Arbroath Joint Line) Act, 1879. This included, by the way, the Carmyllie branch, as to which more in due course.

Returning to Perth, the main-line connections and branches may now be reviewed. The first is the Perth, Almond Valley and Methven, which was leased to the Scottish North Eastern in 1864. The Bankfoot Light Railway from Strathord is quite a recent undertaking, having been opened in 1896, and sold to the Caledonian in 1913. At Stanley Junction the Perth and Dunkeld (opened 1856) was at first worked by the Scottish Midland Junction until its association with the Inverness and Perth Junction Railway caused it to become part of the Highland Railway. The Blairgowrie branch was constructed by the Scottish Midland Junction Railway and opened in 1855. The branch from Ardler Junction to join the Dundee and Newtyle was made about this time, as also the Newtyle-Alyth Junction link. The Alyth Railway was built by a separate company and transferred to the Caledonian in 1875. Alyth Junction station was known as Meigle for many years, indeed, until that name was wanted for what is now the first station on the branch.

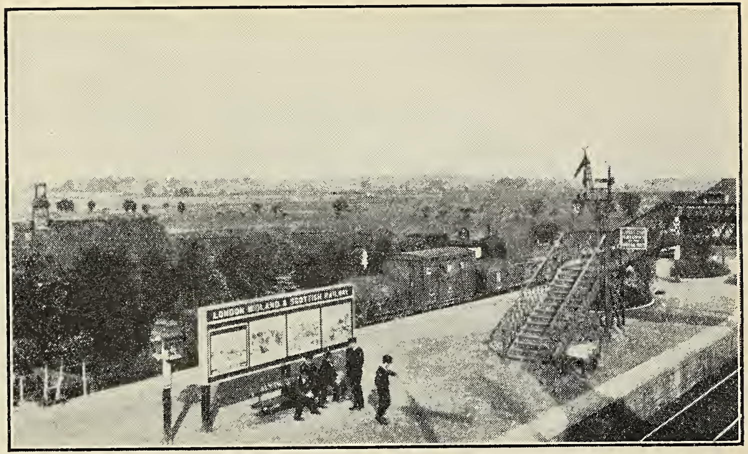
The Kirriemuir branch was built by the Scottish Midland Junction, and opened in 1854. The Forfar-Brechin line was a much later addition, opened in 1895.

The original Dundee and Newtyle line, utilising cable-operated inclined planes to overcome the hills it had to cross, followed a fairly direct route, but in 1864 alterations were authorised providing for a connection with the Dundee-Perth line at Ninewells Junction and deviations from the original route at other places. The Dundee and Forfar route, diverging from the Dundee and Arbroath line at Broughty Ferry, was constructed by the Forfarshire Railway in 1867. Finally, the Brechin and Edzell District Railway Company constructed the Brechin-Edzell line, opened in 1896, the company remaining in existence until grouping.

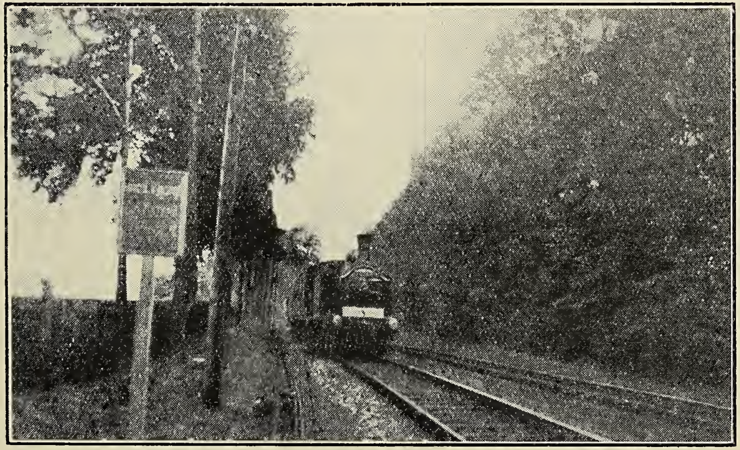
A few descriptive notes may now be given. The Perth-Dundee route has its own platforms at Perth, though through coaches, operated on all the principal services, are usually transferred to and from the main platforms. Just beyond the station the original double line is now operated as single track through Princes Street station (little known outside Perth but handy for residents and parts of the City) and across the viaduct which spans the Tay. This viaduct is curved, and is 1,375 ft. in length, with 23 spans. It carries one line of rail only, with a public footway alongside, and from it one has splendid views up and down the river and of the picturesque residences on Barnhill.



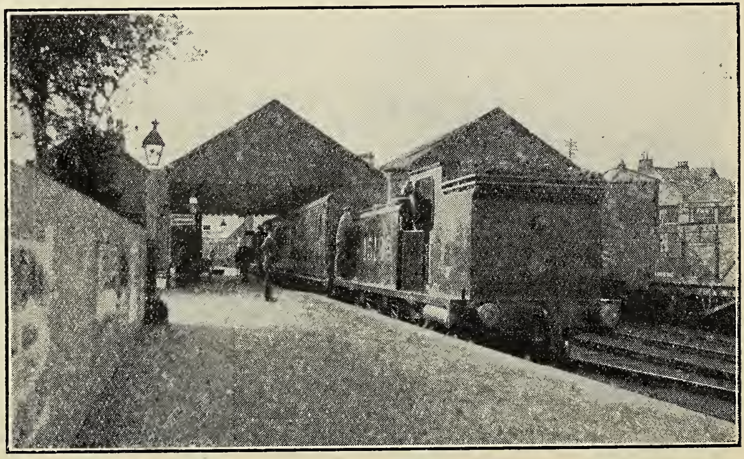
COUPAR ANGUS JUNCTION.



ALYTH JUNCTION.



BRANCH TRAIN APPROACHING BLAIRGOWRIE.



BRANCH TRAIN AT ALYTH.

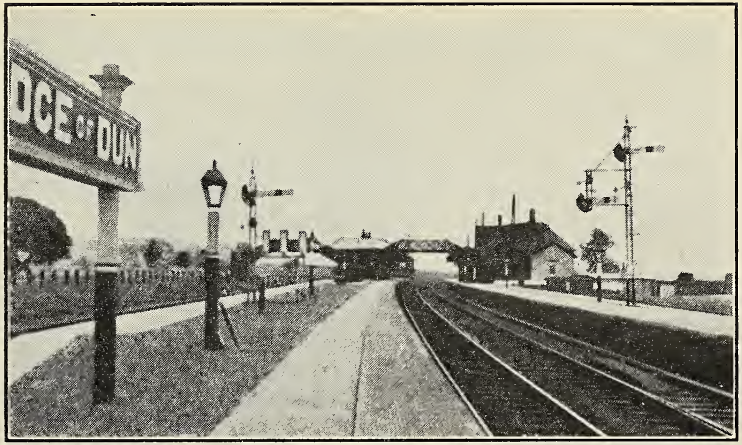
Beyond the bridge the route becomes double track, and is so all the way to Dundee. For some distance the Tay is in view, and is rejoined at Invergowrie, by which time the river is fairly wide, with a good view of the famous L.N.E.R. bridge ahead. At Ninewells Junction the Newtyle line comes in and the rest of the route is used by trains on both services. Magdalen Green station is close to the Esplanade station of the L.N.E.R., while Dundee West is next door to Tay Bridge station. Dundee West has fine buildings, with clock tower, district offices, &c. It has four platforms, with refreshment and dining rooms and other equipment in accordance with its traffic importance. The Dundee-Perth line carries a good deal of residential traffic, as also does the Newtyle line to some extent.

The Dundee and Newtyle Railway was one of the very earliest railways in Scotland, having been authorised in May, 1826, and opened for traffic in December, 1831. Its history includes many features of interest, though for full details readers may be referred to an article published in the February and March, 1910, numbers of the RAILWAY MAGAZINE and written by Mr. C. E. S. Littlejohn. It began in Dundee in Ward Road, where, however, the original station has long since been demolished and but few traces remain. Thence trains were hauled up in a 1 in 10 incline by means of a stationary engine. At the summit there was a 42-chain tunnel, and for a length of 4¾ miles the line was operated by locomotive traction. Only about half of this route is, however, used at the present day, in that trains now cut out entirely the incline, and, instead, leave the Dundee (West)—Perth line at Ninewells Junction, about 1½ miles from Dundee, thence following a circuitous route *via* Liff, Lochee (West) and Lochee, so that a detour of several miles is made (avoiding otherwise extreme gradients) to return to the northern suburbs of Dundee, and join the old line just before Baldovan station is reached.

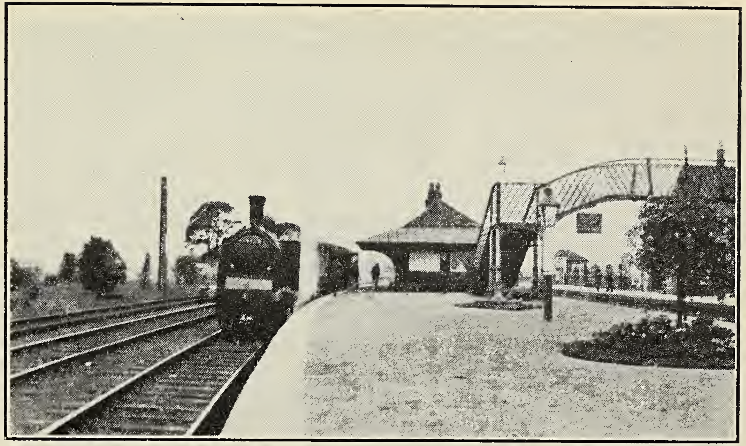
At Rosemill, at the foot of the Balbeuchley incline (1 in 25 for a mile, once operated by a stationary engine), the old line is again left, and a detour, again to obtain easier gradients, made *via* Dronley to Auchterhouse. Thence the original route is utilised to the foot of the Hatton incline (descending at 1 in 15 to Newtyle, another stationary engine plane), but the present route takes a long circuitous way, passing right round the town of Newtyle to an entirely new station. Beyond the station the line curves round to a junction where it divides to enable trains to proceed either to join the main line to run to Coupar-Angus and Blairgowrie or to cross it and join it at Alyth Junction. Shortly before this junction is reached, however, there is a backward connection with a short line which leads to the original Newtyle station, but approached from the opposite side, where part of the old buildings still remain and are incorporated in the goods depôt which meets the needs of the town.

The Dundee and Newtyle Railway was at first laid to the 4 ft. 6½ in. gauge, horses being used on the level stretches. Locomotives were, however, introduced in 1833, the first being the *Earl of Airlie*, an engine which is illustrated in most books dealing with early locomotive history, largely because of the fact that it had a four-wheeled trailing bogie. At Newtyle connection was made (*via* the goods connection mentioned) with the Newtyle and Coupar Angus and Newtyle and Glamis (the route to Alyth Junction) Railways, these also being worked by horse-power for a period, though occasionally Dundee and Newtyle locomotives worked on them. The Newtyle and Coupar Angus line included an incline near Ardler, on which cable haulage was used.

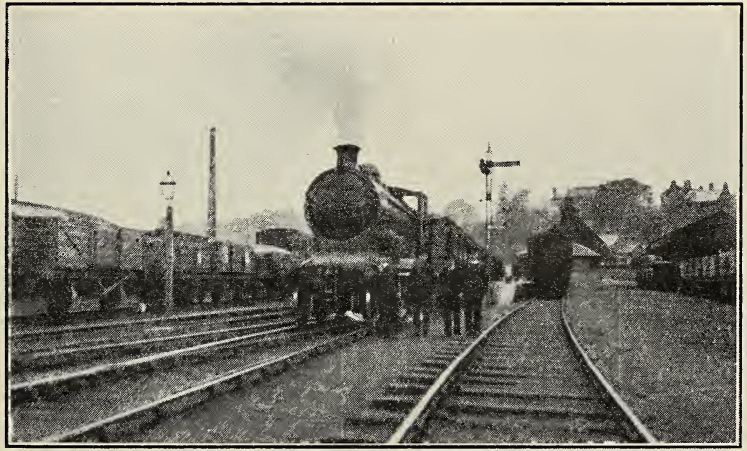
The Dundee and Arbroath Joint Line is a busy section, and is remarkable for the long series of waterside golf links which border it as the Tay estuary opens out to sea, notably Broughty Ferry, Monifieth, Barry Links, Carnoustie and Easthaven, with Arbroath itself. There is a big local and residential traffic on this section. Just beyond Broughty Ferry station the L.M.S. branch to Forfar diverges on the up side, then crossing the Joint Line by an overbridge. At Elliott Junction the Carmyllie Light Railway connects at the northern end of the down side of the main line platform, an island. This light railway is a very old one, built originally for the conveyance of granite—at one time in



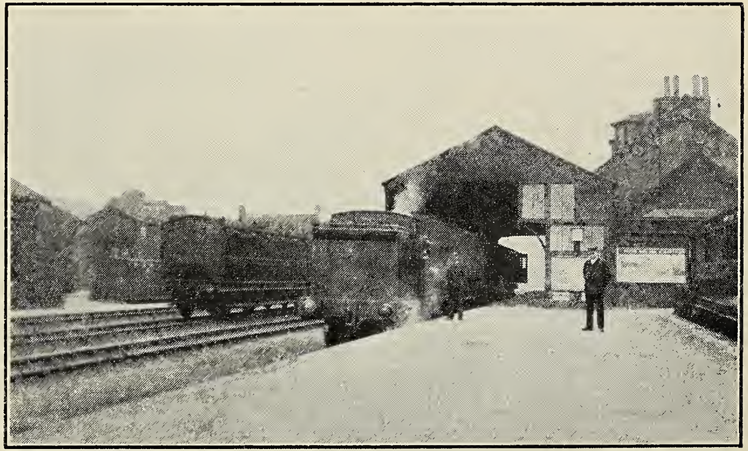
BRIDGE OF DUN JUNCTION.



DUBTON JUNCTION.



BRANCH TRAIN AT KIRRIEMUIR.



BRANCH TRAIN AT MONTROSE.

great request—from the quarries beyond the present terminus.

Passenger, freight and shunting power for the Joint Line is provided in equal shares by the two owning companies, as is also the coaching stock. Dundee East station has an arched glazed roof and has a rather impressive frontage, though it is somewhat antiquated within. There are four platforms and extensive sidings. At Camperdown Junction connection is made with the L.N.E.R. incline from Tay Bridge station through Dock Street tunnel. For the next mile or so the line borders the docks, with frequent level crossings and footbridges, which, if one passes at the times of commencing or finishing work in the docks, are alive with workers.

The Broughty Ferry-Forfar line calls for no descriptive reference, though, like the Newtyle line, it is steeply graded. Many of the Dundee-Forfar trains include sections for Kirriemuir and Brechin which are divided, or combined, at Forfar. The Arbroath-Guthrie line is interesting because of the viaduct at Friockheim station, carrying a branch which joins the main line at Glasterlaw Junction, thus completing a triangular connection. This was important in early days, and even in comparatively recent years there were trains from Arbroath to Montrose this way. With the completion of the L.N.E.R. direct line, however, it gradually lost its importance, and for some years past the Friockheim-Glasterlaw side of the triangle has been taken up, and the Glasterlaw signal box disused.

The remaining branches call for little comment. The Almond Valley Junction-Methven and Crieff branch is really outside our present subject matter. It was described in the January, 1926, number of The Railway Magazine, and it will be sufficient to mention that Sentinel-Cammell steam cars have been introduced for intermediate services with advantage. The Bankfoot Light Railway has at Strathord a side platform beyond the goods yard for branch trains, but many of the services are worked through to and from Perth. Bankfoot station is interesting because beyond it is a cairn "In Memory of Those Who Gave Their Lives in the Great War," and beyond and behind it a church on a hill, a rather impressive combination which it was, unfortunately impossible to record photographically on the occasion of the writer's visit.

Stanley Junction has an island on the down side, of which the outer face is unusually allocated to up Highland trains. This allows an up train to reach a platform, and thus clear the way for a down train on the single line, though it may not be possible to send it on to the up main line at once. Coupar Angus has an island on the down side. Blairgowrie is a fairly busy place, but the branch has little of special interest, except where it overlooks the river approaching the terminus. At Alyth Junction trains from Newtyle cross the main lines by an overbridge and then descend to a side platform. The combination is rather picturesque. Beyond the station are connections to and from the main lines, after which the branch curves away. Alyth has the usual country branch line terminus.

Forfar station is on a curve and each platform has a bay, at the north end on the down side and at the south end on the up side. A good deal of traffic manœuvring has to be carried out with limited accommodation, though at the north end there are extensive sidings, goods depôt and engine shed. On the up side there is a connection from the sidings to a short branch, now leading only to the gasworks, but originally serving the terminus of the Arbroath and Forfar Railway before through main-line communication was completed.

Brechin is a rather busy country town. The station has a somewhat attractive frontage in the angle between two thoroughfares, artistic iron and glass work, with floral decorations, creating a pleasing combination. There are two main platforms, with a bay on one side, and adjacent are somewhat extensive goods premises. Outside the station the Forfar line first diverges and the engine shed is adjacent thereto. Edzell and Forfar ~~Bridge of Dun~~ trains proceed alongside one another for some distance, the original double line being now operated as two single lines.

At Bridge of Dun there is an island platform on the down side, the outer face being utilised for branch and local trains either way as convenient. Dubton Junction has an island on the up side, the

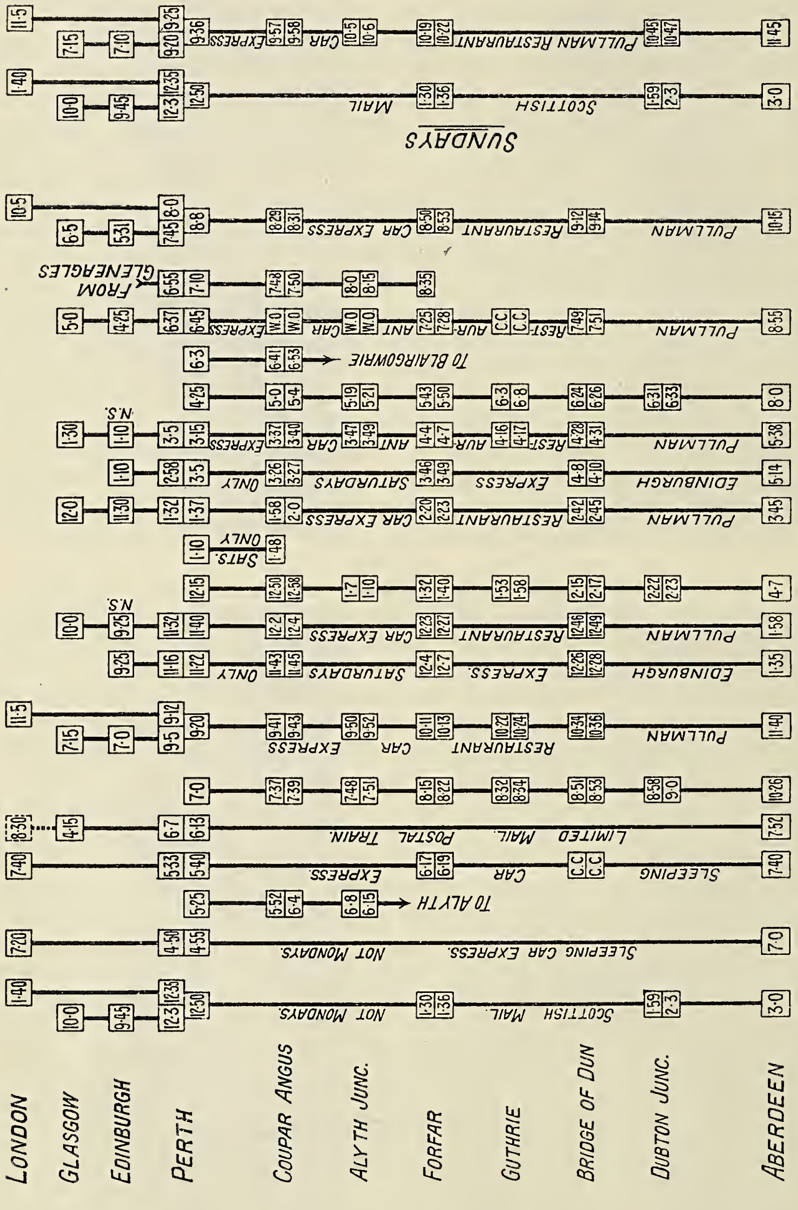

LONDON
GLASGOW
EDINBURGH
PERTH
COUPAR ANGUS
ALYTH JUNC.
FORFAR
GUTHRIE
BRIDGE OF DUN
DUBTON JUNC.
ABERDEEN
SCOTTISH MAIL. NOT MONDAYS.
SLEEPING CAR EXPRESS. NOT MONDAYS.
TO ALYTH
SLEEPING CAR EXPRESS.
LIMITED MAIL. POSTAL TRAIN.
RESTAURANT CAR EXPRESS
PULLMAN
EDINBURGH EXPRESS. SATURDAYS ONLY
N.S.
PULLMAN RESTAURANT CAR EXPRESS
SATS. ONLY
EDINBURGH EXPRESS SATURDAYS ONLY
PULLMAN REST-AUR-ANT CAR EXPRESS
TO BLAIRGOWRIE
FROM GLENEAGLES
W.O
C.C
SUNDAYS
SCOTTISH MAIL
PULLMAN RESTAURANT CAR EXPRESS

DIAGRAM A.—DOWN MAIN-LINE SERVICES, PERTH-ABERDEEN SECTION, L.M.S.R.

Junction stations only are shown, and details between Dubton Junction and Aberdeen are omitted.

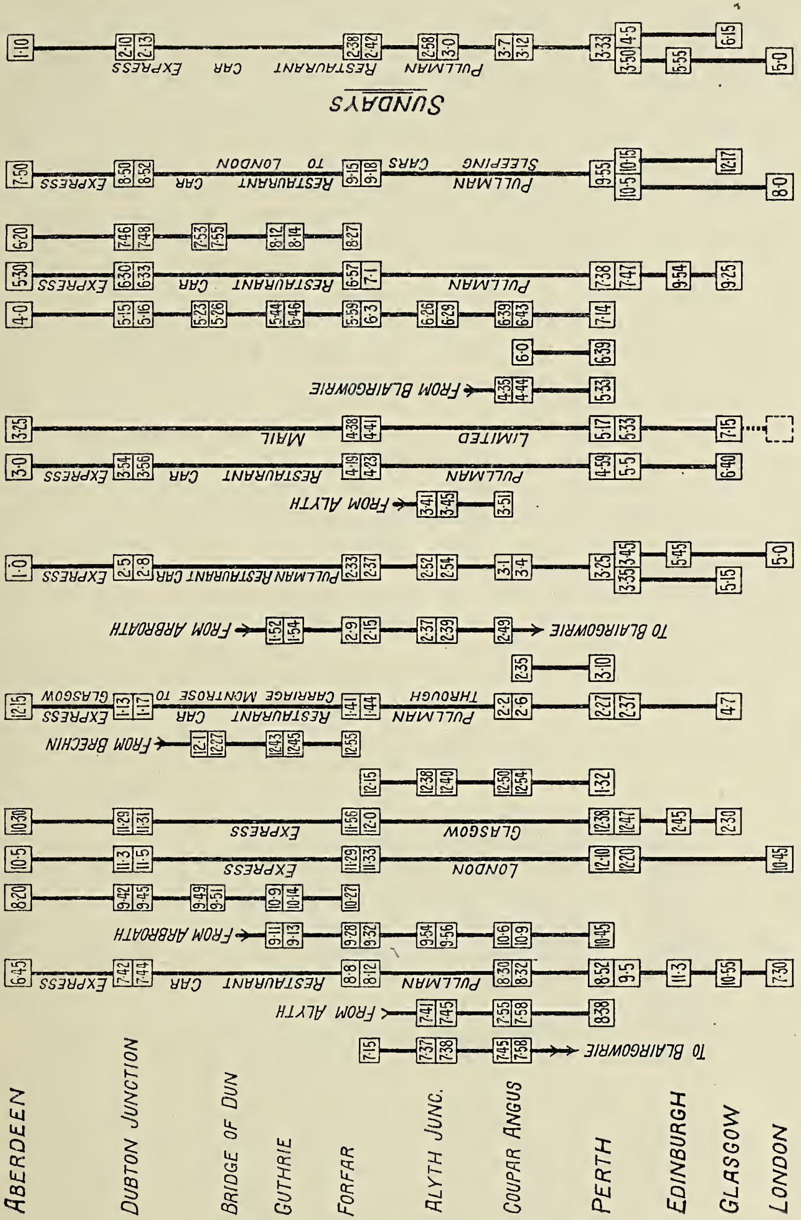

ABERDEEN
DUBTON JUNCTION
BRIDGE OF DUN
GUTHRIE
FORFAR
ALYTH JUNC.
COUPAR ANGUS
PERTH
EDINBURGH
GLASGOW
LONDON
7·15 7·37 7·38 7·45 7·58 TO BLAIRGOWRIE
FROM ALYTH 7·41 7·45 7·55 7·58 8·38
6·45 EXPRESS 7·42 7·44 RESTAURANT CAR 8·8 8·12 PULLMAN 8·30 8·32 8·52 9·5 11·3 10·55 7·30
FROM ARBROATH 9·11 9·13 9·28 9·32 9·54 9·56 10·6 10·9 10·45
8·20 9·42 9·45 9·49 9·51 10·9 10·14 10·27
10·5 11·3 11·5 EXPRESS 11·29 11·33 LONDON 12·10 12·20 10·45
10·30 11·29 11·31 EXPRESS 11·56 12·0 GLASGOW 12·38 12·47 2·45 2·30
12·15 12·38 12·40 12·50 12·54 1·32
FROM BRECHIN 12·1 12·27 12·43 12·45 12·55
12·15 EXPRESS 1·13 1·17 RESTAURANT CAR 1·41 1·44 PULLMAN 2·2 2·6 2·27 2·37 4·7
THROUGH CARRIAGE MONTROSE TO GLASGOW
2·35 3·10
FROM ARBROATH 1·52 1·54 2·9 2·15 2·37 2·39 2·49 TO BLAIRGOWRIE
1·0 EXPRESS 2·5 2·8 PULLMAN RESTAURANT CAR 2·33 2·37 2·52 2·54 3·1 3·4 3·25 3·35 3·45 5·45 5·15 5·0
FROM ALYTH 3·41 3·45 3·51
3·0 EXPRESS 3·54 3·56 RESTAURANT CAR 4·19 4·23 PULLMAN 4·59 5·5 6·40
3·25 MAIL 4·38 4·41 LIMITED 5·17 5·33 7·15
FROM BLAIRGOWRIE 4·35 4·44 5·33
6·0 6·39
4·0 5·15 5·16 5·23 5·26 5·44 5·46 5·59 6·3 6·26 6·29 6·39 6·43 7·14
5·30 EXPRESS 6·30 6·33 RESTAURANT CAR 6·57 7·1 PULLMAN 7·38 7·47 9·54 9·25
6·20 7·46 7·48 7·53 7·55 8·12 8·14 8·27
7·50 EXPRESS 8·50 8·52 RESTAURANT CAR TO LONDON 9·15 9·18 PULLMAN SLEEPING CARS 9·55 10·5 10·15 12·17 8·0
SUNDAYS
1·10 EXPRESS 2·10 2·13 CAR RESTAURANT 2·38 2·42 PULLMAN 2·58 3·0 3·7 3·12 3·33 3·50 4·5 5·55 6·15 5·0

DIAGRAM B.—UP MAIN-LINE SERVICES, ABERDEEN-PERTH SECTION, L.M.S.R.

Junction stations only are shown, and details between Aberdeen and Dubton Junction are omitted.

branch curving away at once on a lower level to work round to Montrose (the city is in full view from Dubton). After passing under the L.N.E.R. main-line connection is made at Broomfield Junction with the Bervie line and with the L.N.E.R. connection. Bervie-Montrose (L.N.E.R.) trains thus cross the Dubton-Montrose (L.M.S.) route. At one time Bervie trains worked to and from the L.M.S. station, but for many years past have been worked by the L.N.E.R.

Montrose (L.M.S.) station is adjacent to the harbour, and from the goods yard tracks lead on to the quayside. Here the river is wide and picturesque, with the L.N.E.R. viaduct over the twin mouths of the river North Esk to the right. The L.M.S. station is of the usual Caledonian branch line type, with one platform (and a short bay) and an all-over roof covering the platform, the platform line and the adjacent track. The goods premises are of considerable extent.

Having thus cleared the ground, both historically and descriptively, the train services may be reviewed. As, however, they are principally interesting because of their inter-working, this part of our subject can be largely dealt with by specially-prepared diagrams, a method which has the further advantage of covering the ground simply and clearly without requiring a great deal of space.

Diagram A covers the down main-line train service, and diagram B those in the up direction, though details apply only between Perth and Dubton Junction, in that there are only a few local trains working north of Dubton Junction (principally between Aberdeen and Stonehaven) besides the through trains. In general, the diagrams are self-explanatory. It should be noted, however, that, apart from the early morning trains, largely sleeping car, mail or other through expresses, all down expresses make at least one call between Perth and Forfar, also stopping at Bridge of Dun for Brechin and Montrose connections. In the up direction it is mainly by the arrangement of connecting trains (allowing for the up equivalents to the early morning down trains) that there are as many as six non-stop expresses (all except the postal train stopping at Dubton Junction for Montrose and Brechin connections) from Forfar to Perth.

Connections at Blairgowrie are particularly complete, but Alyth Junction gets quite a number of services, allowing for a few by connecting trains. Guthrie does not get so many, as the more usual arrangment is for the Arbroath trains to make their main-line connections at Forfar. Otherwise, the chief point of interest is the comparative frequency of the train services, particularly of express and semi-fast trains. Most of the trains are, moreover, through expresses to and from Glasgow (with Edinburgh connections or sections), with Pullman restaurant cars and made up of modern corridor stock. In several instances there are separate Edinburgh trains in the down direction on Saturdays in advance of the main Glasgow trains. Speaking generally, trains which have calls at all stations marked are stopping trains, but if either Bridge of Dun or Dubton Junction is passed they are not so, even although all other stations are shown. The situation as regards Bridge of Dun and Dubton Junction will be considered further later.

The interesting point at Coupar Angus is that so many of the branch trains work to or from the Newtyle and Dundee line or the main line, so that it is only the intermediate connections which are restricted to the Blairgowrie branch itself. Consequently, the service of 14 trains each way daily on the branch is made up of through trains from Perth, Forfar or Alyth, from Dundee *via* Newtyle, and local trips. The through trains frequently wait at Coupar Angus to make connections with main-line trains, but there are some good through trains, especially on the Dundee route.

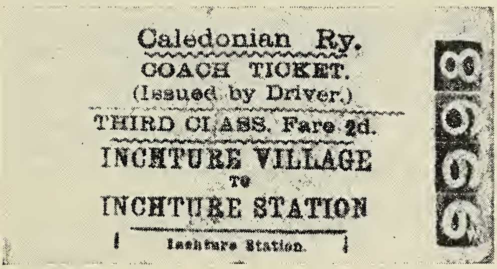
Incidentally, the service on the branch is much fuller than one would expect. Of the Blairgowrie-Coupar Angus trains five (six on Saturdays) continue on to Newtyle and Dundee. The return workings are rather more complex, in that there are instances where, on Saturdays or Saturdays excepted, the branch is served either by a through train or by a local train. There is also one train from Forfar to Blairgowrie and one to and one from Perth.

(*To be continued.*)

The Perth-Dundee-Montrose Section of the L.M.S.R.

Commenting upon this article in the July and August numbers, Mr. T. R. Perkins writes :—

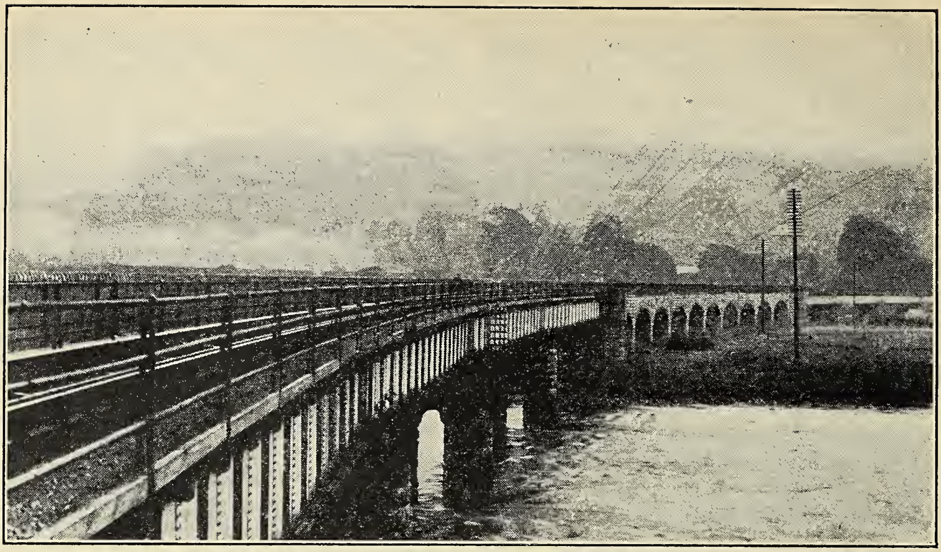
"I was over those lines in 1912, and your article brings back happy memories. I note your map still shows the branch from Inchture station to the village. When I was over it, it was worked by a *horse*, like the N.B.R. Port Carlisle line, and so was a curiosity ; in fact, I think it was the last in this island to be so worked, as the Port Carlisle was converted to steam before the war. I enclose herewith the ticket (this is illustrated) I had on the occasion of my trip by the horse-train."



Caledonian Ry.
COACH TICKET.
(Issued by Driver.)
THIRD CLASS. Fare 2d.
INCHTURE VILLAGE
TO
INCHTURE STATION
Inchture Station.

Mr. D. B. McKenzie points out that a statement on page 7 of the July number is not quite correct. It is the Edzell and Forfar trains which take a parallel course from Brechin for a short distance and not the Edzell and Bridge of Dun train as stated.

Aug 192



TAY BRIDGE AT PERTH, L.M.S.R.

The Perth-Dundee-Montrose Section of the L.M.S.R. [No. II.]

By J. F. GAIRNS, M.I.Loco.E., M.Inst.T.

IT is, however, at Forfar that the connections and inter-connections are most complex, as will be seen from Diagram C. Here the main-line trains are prominently marked to emphasise and distinguish them, and the up and down services are separated, though the trains are so positioned that up connections can be associated with down trains or *vice versa*. There are, as already explained, branch services north of Forfar to and from Arbroath and Dundee and south to and from Kirriemuir and Brechin. The Forfar-Arbroath trains, however, usually (not always) constitute a separate service. In one or two instances the Arbroath trains work only to or from Guthrie, and there connect with main-line trains. Dundee trains, however, have Kirriemuir and Brechin sections, divided or combined at Forfar, and there are instances of Arbroath-Forfar, Blairgowrie-Forfar, and Perth-Forfar trains being combined with these services. The great point is, however, the groups of trains which provide the connections and interconnections in front of and behind main-line trains, with a few shuttle services to complete. It may be noted, too, that there are a good many trains which are operated for local requirements, apart from those associated with main-line services.

Diagram D covers the Bridge of Dun and Dubton Junction connections to and from Montrose and Brechin. The peculiarity here is that down express or semi-fast trains usually call at Bridge of Dun and omit Dubton Junction, while corresponding up trains call at Dubton Junction and pass Bridge of Dun. Notwithstanding this, however, the services are very complete. As a rule, a train comes from Brechin to Bridge of Dun and follows the main-line train with which it connects to serve Dubton Junction and Montrose, while a train from Montrose follows an up express from Dubton Junction to serve Bridge of Dun and Brechin. Passengers from Montrose for the Aberdeen direction

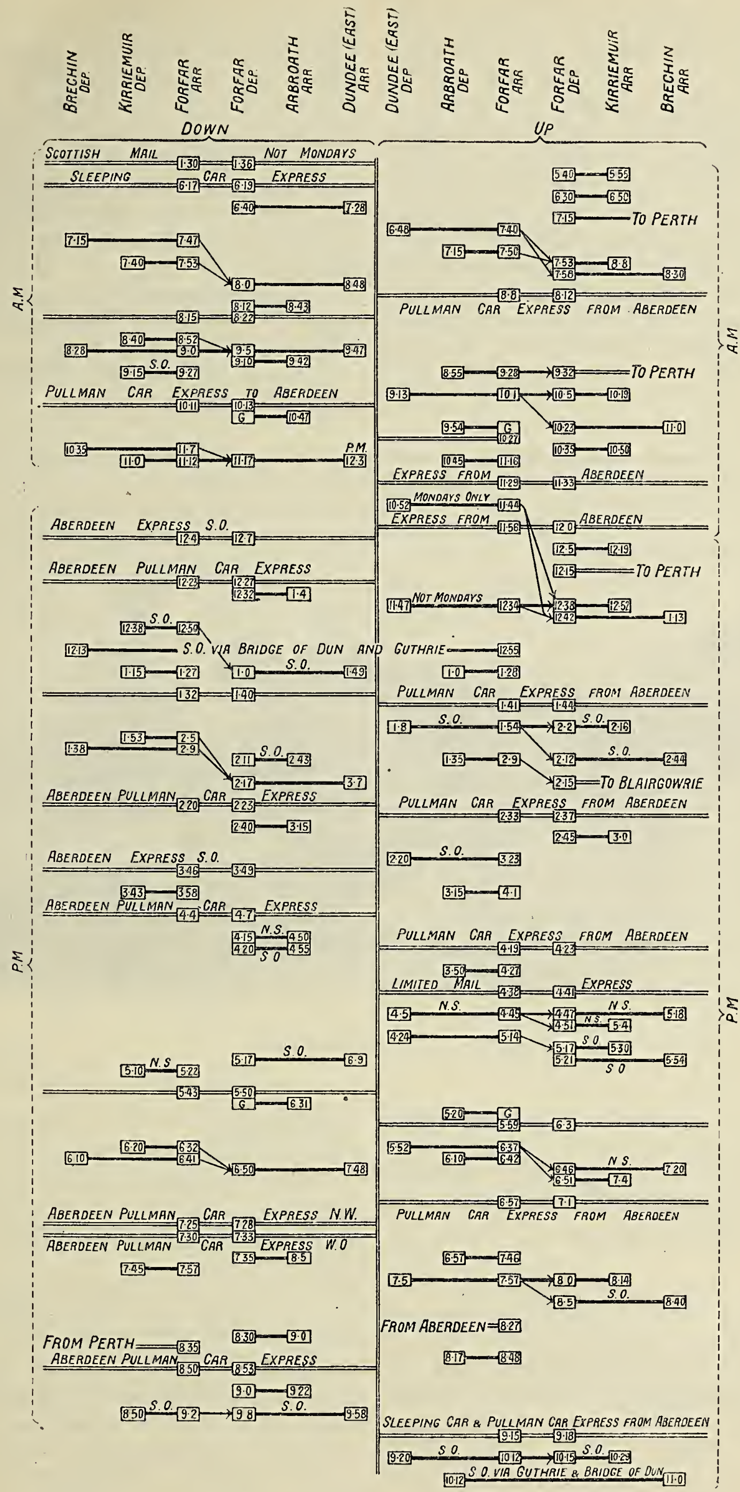
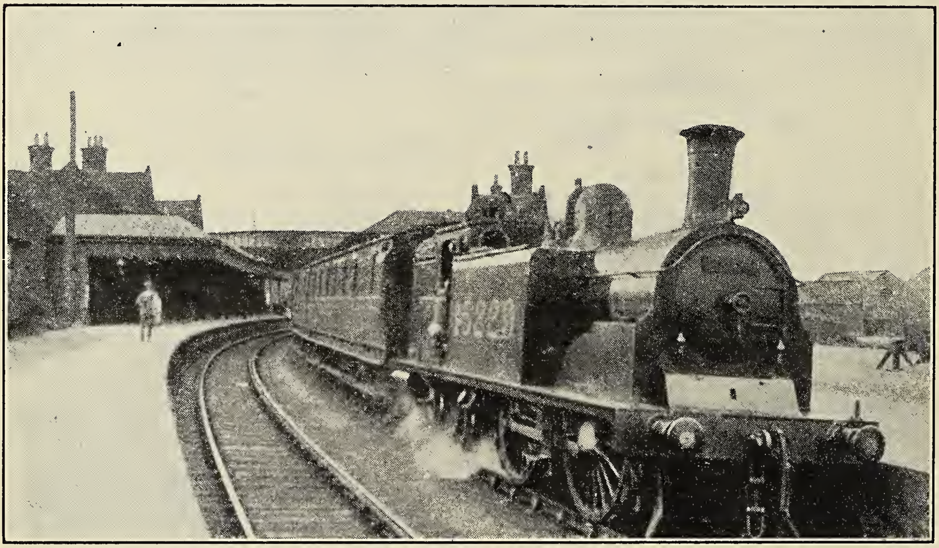


DIAGRAM C.—LOCAL SERVICES AND MAIN-LINE CONNECTIONS AT FORFAR.

are allowed to travel to Bridge of Dun if necessary, and those for Brechin can go to Dubton Junction to join up trains. This involves no hardship, however, owing to the very complete services, as there seem to be local trains running to and fro all day long connecting with main-line trains as required, and in between times meeting local needs. One or two unusual items may be noted: the 12.13 p.m. from Brechin on Saturdays reverses at Brechin and then runs to Forfar, thence continuing to Dundee instead of going direct from Brechin to Forfar; the 10.12 p.m. from Arbroath on Saturdays goes to Brechin *via* Guthrie and Bridge of Dun, and a train comes from Craigo (on the Aberdeen line) at 2.17 p.m. to Dubton Junction and Montrose on Saturdays and returns at 9.50 p.m.

A few notes may now be given, in conclusion, as to the interesting features of individual train services. With regard to the Perth-Crieff-Balquhidder line, it may be mentioned that there are trains from Perth at 8.30 a.m., 10.10 a.m. (express to Crieff), 12.30 p.m. and 5.22 p.m. (from Dundee, express to Crieff) to Balquhidder; at 9.15 a.m., 1.52 p.m. (Saturdays only), 4.15 p.m., 6.8 p.m. to Crieff, and 9.20 p.m. (Saturdays only) to Comrie, and at 9.5 p.m. on Saturdays to Methven. Returning trains arrive at Perth from Balquhidder at 9.6 a.m., 11.12 a.m. (from Comrie), 1.23 p.m. and 3.5 p.m. (express from Crieff); from Crieff at 8.32 a.m., 2.53 p.m., 6.52 p.m., 8.25 p.m. (Saturdays only) and 9.10 p.m. (Saturdays only). Recently, however, a Sentinel-Cammell coach has been introduced for working the short Methven Junction-Methven branch, and this makes three daily (four on Saturdays) additional journeys to and from Perth.

Between Perth and Dundee there is quite a big train service, including a good proportion of expresses, many including through coaches if they do not actually constitute portions of expresses to and from Glasgow. From Perth there are non-stop trains at 6.17 a.m. (in connection with the Postal Train from London and the associated 4.15 a.m. from Glasgow); 9.12 a.m. (7.15 a.m. ex Glasgow); 9.30 a.m. (with through carriages and sleeping cars from London); 10.55 a.m. (9.15 a.m. ex Glasgow); 1.45 p.m. (12 noon ex Glasgow); 3.27 p.m. (1.40 p.m. ex Glasgow); 5.30 p.m., 6.44 p.m. (5 p.m. ex Glasgow); 8.10 p.m. and 9.15 p.m. There are also stopping



0-4-4T No. 15229 AT FORFAR.

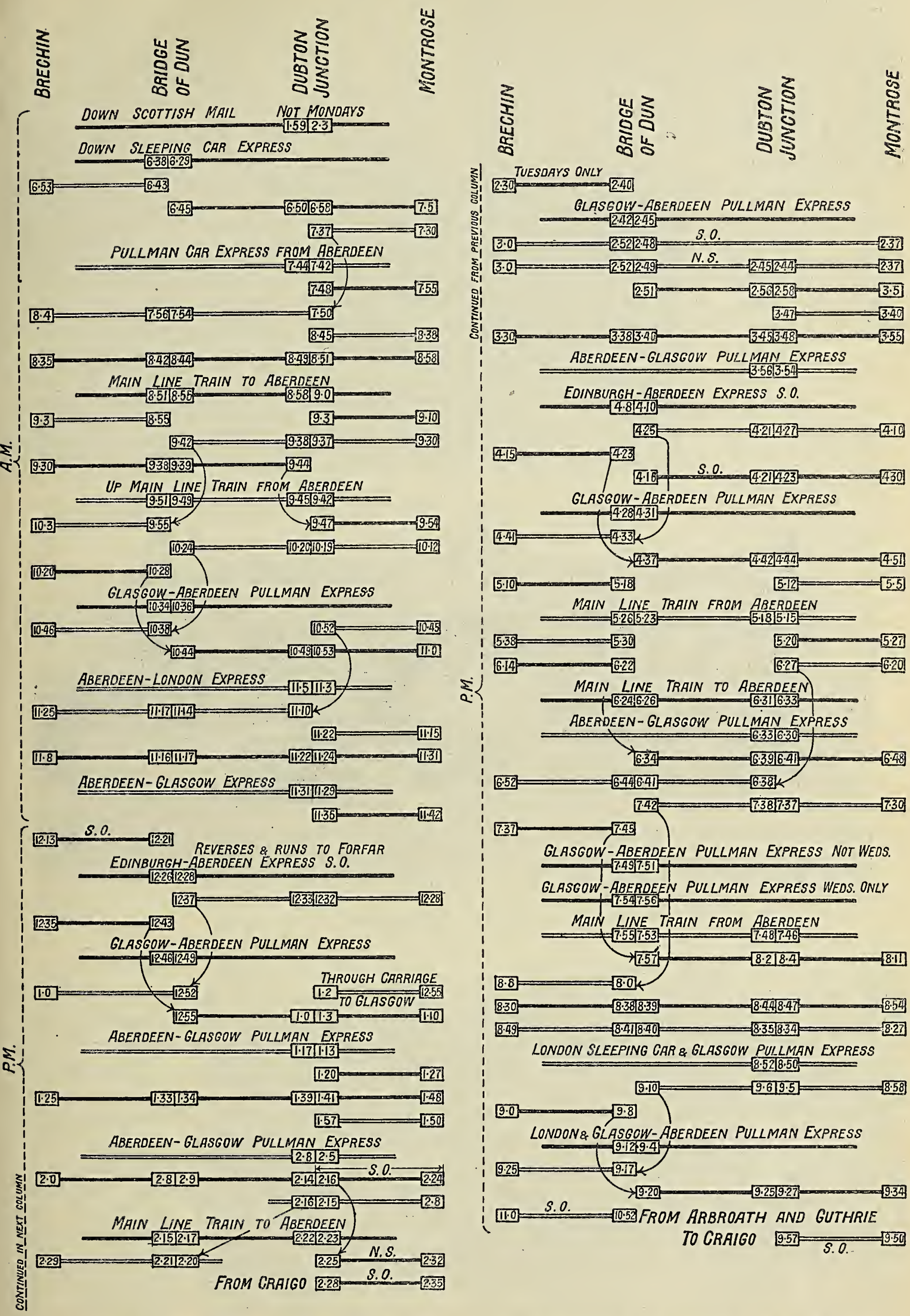

BRECHIN
BRIDGE OF DUN
DUBTON JUNCTION
MONTROSE
DOWN SCOTTISH MAIL NOT MONDAYS 1·59 2·3
DOWN SLEEPING CAR EXPRESS 6·38 6·29
6·53 6·43
6·45 6·50 6·58 7·5
7·37 7·30
PULLMAN CAR EXPRESS FROM ABERDEEN 7·44 7·42
7·48 7·55
8·4 7·56 7·54 7·50
8·45 8·38
8·35 8·42 8·44 8·49 8·51 8·58
MAIN LINE TRAIN TO ABERDEEN 8·51 8·55 8·58 9·0
9·3 8·55
9·3 9·10
9·42 9·38 9·37 9·30
9·30 9·38 9·39 9·44
UP MAIN LINE TRAIN FROM ABERDEEN 9·51 9·49 9·45 9·42
10·3 9·55
9·47 9·54
10·24 10·20 10·19 10·12
10·20 10·28
GLASGOW-ABERDEEN PULLMAN EXPRESS 10·34 10·36
10·46 10·38
10·52 10·45
10·44 10·49 10·53 11·0
ABERDEEN-LONDON EXPRESS 11·5 11·3
11·25 11·17 11·14 11·10
11·22 11·15
11·8 11·16 11·17 11·22 11·24 11·31
ABERDEEN-GLASGOW EXPRESS 11·31 11·29
11·36 11·42
A.M.
12·13 S.O. 12·21
REVERSES & RUNS TO FORFAR
EDINBURGH-ABERDEEN EXPRESS S.O. 12·26 12·28
12·37 12·33 12·32 12·28
12·35 12·43
GLASGOW-ABERDEEN PULLMAN EXPRESS 12·46 12·49
1·0 12·52
THROUGH CARRIAGE 1·2 TO GLASGOW 12·55
12·55 1·0 1·3 1·10
ABERDEEN-GLASGOW PULLMAN EXPRESS 1·17 1·13
1·20 1·27
1·25 1·33 1·34 1·39 1·41 1·48
1·57 1·50
ABERDEEN-GLASGOW PULLMAN EXPRESS 2·8 2·5
2·0 2·8 2·9 2·14 2·16 S.O. 2·24
2·16 2·15 2·8
MAIN LINE TRAIN TO ABERDEEN 2·15 2·17 2·22 2·23
2·29 2·21 2·20 2·25 N.S. 2·32
FROM CRAIGO 2·28 S.O. 2·35
P.M.
CONTINUED IN NEXT COLUMN
CONTINUED FROM PREVIOUS COLUMN
BRECHIN
BRIDGE OF DUN
DUBTON JUNCTION
MONTROSE
TUESDAYS ONLY 2·30 2·40
GLASGOW-ABERDEEN PULLMAN EXPRESS 2·42 2·45
3·0 2·52 2·48 S.O. 2·37
3·0 2·52 2·49 N.S. 2·45 2·44 2·37
2·51 2·56 2·58 3·5
3·47 3·40
3·30 3·38 3·40 3·45 3·48 3·55
ABERDEEN-GLASGOW PULLMAN EXPRESS 3·56 3·54
EDINBURGH-ABERDEEN EXPRESS S.O. 4·8 4·10
4·25 4·21 4·27 4·10
4·15 4·23
4·16 S.O. 4·21 4·23 4·30
GLASGOW-ABERDEEN PULLMAN EXPRESS 4·28 4·31
4·41 4·33
4·37 4·42 4·44 4·51
5·10 5·18 5·12 5·5
MAIN LINE TRAIN FROM ABERDEEN 5·26 5·23 5·18 5·15
5·38 5·30 5·20 5·27
6·14 6·22 6·27 6·20
MAIN LINE TRAIN TO ABERDEEN 6·24 6·26 6·31 6·33
ABERDEEN-GLASGOW PULLMAN EXPRESS 6·33 6·30
6·34 6·39 6·41 6·48
6·52 6·44 6·41 6·38
7·42 7·38 7·37 7·30
7·37 7·45
GLASGOW-ABERDEEN PULLMAN EXPRESS NOT WEDS. 7·49 7·51
GLASGOW-ABERDEEN PULLMAN EXPRESS WEDS. ONLY 7·54 7·56
MAIN LINE TRAIN FROM ABERDEEN 7·55 7·53 7·48 7·46
7·57 8·2 8·4 8·11
8·8 8·0
8·30 8·38 8·39 8·44 8·47 8·54
8·49 8·41 8·40 8·35 8·34 8·27
LONDON SLEEPING CAR & GLASGOW PULLMAN EXPRESS 8·52 8·50
9·10 9·6 9·5 8·58
9·0 9·8
LONDON & GLASGOW-ABERDEEN PULLMAN EXPRESS 9·12 9·4
9·25 9·17
9·20 9·25 9·27 9·34
11·0 S.O. 10·52 FROM ARBROATH AND GUTHRIE
TO CRAIGO 9·57 S.O. 9·50
P.M.

DIAGRAM D. LOCAL SERVICES AND MAIN-LINE CONNECTIONS AT BRIDGE OF DUN AND DUBTON JUNCTION.

or semi-fast trains, the latter providing for residential traffic, at 7, 7.30, 8.40, 10 and 11.45 a.m., and 1 (1.10 on Saturdays), 2 (Saturdays only), 4.10, 5.40, 7.15, 7.50, 8.10, 9.15 and 9.35 (Saturdays only) p.m.; also 3 p.m. from Errol to Dundee and 10.30 p.m. (Saturdays only), Perth to Errol.

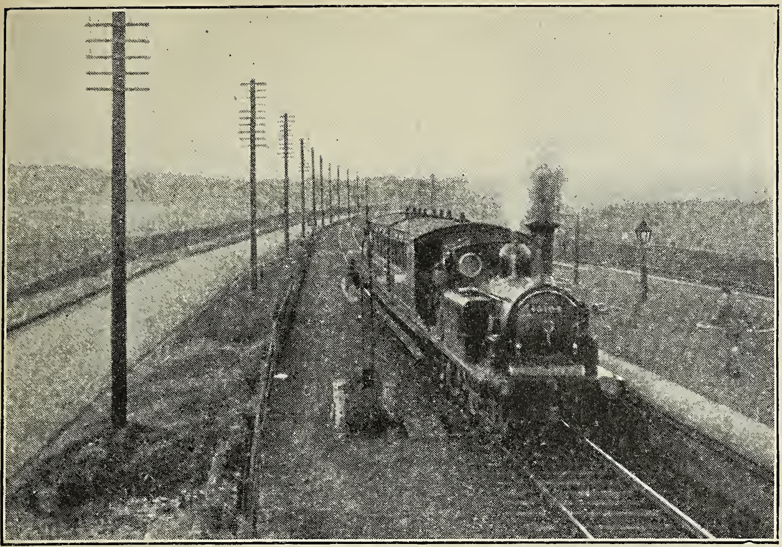
In the opposite direction, non-stop expresses leave Dundee at 8.25, 9.30, 10.25 and 11.30 a.m., and 1.5 (Saturday only), 2, 2.55, 4.45 and 7.5. p.m., with the London sleeping-car train at 9.20 p.m. There are slow or semi-fast trains at 6.55, 8, 9 and 10.45 a.m., and at 12.45 1.20 (Saturdays only), 4.9, 5.10, 6.8, 7.25, 8.25, 10.15 p.m. (10.40 p.m. on Saturdays), with a local from Dundee to Errol at 2.15 p.m. A few of the expresses have one or more conditional stops.

On the Bankfoot Light Railway there is quite a frequent service of mixed or purely passenger trains, a number of services working to or from Perth, with important variations on Saturdays. On other week-days there are trains from Perth to Bankfoot at 10.15 a.m. and 5.45 and 7 p.m., with locals from Strathord at 7.20, 8.27 a.m., 12.38 and 4.45 p.m., whereas on Saturdays the through trains from Perth run at 10.15 a.m., 12.35, 2.20, 5.45, 7 and 8.40 p.m., with locals at 7.20 and 8.27 a.m., and 4.45 p.m. From Bankfoot there are (except on Saturdays) trains to Perth at 9.10 a.m. and 6.18 p.m., with locals to Strathord at 8.5 a.m. and 12.58, 4.15 and 5.5 p.m., while on Saturdays through trains are run at 9.10 a.m., 12 noon, 1.20, 6.18 and 8.5 p.m., and to Strathord only at 8.5 a.m. and 3.15, 5.5 and 9.15 p.m. Trains which operate on the branch only, of course, connect with stopping trains on the main line.

An unusual item, a relic of old arrangements, is the working of two L.N.E.R. freight trains (one on Saturdays) from Dundee *via* Arbroath and Forfar, through to Kirriemuir and back. There are also two L.N.E.R. through freight trains each way between Brechin and Montrose (L.N.E.R.) *via* Bridge of Dun, Dubton Junction and Broomfield Junction.

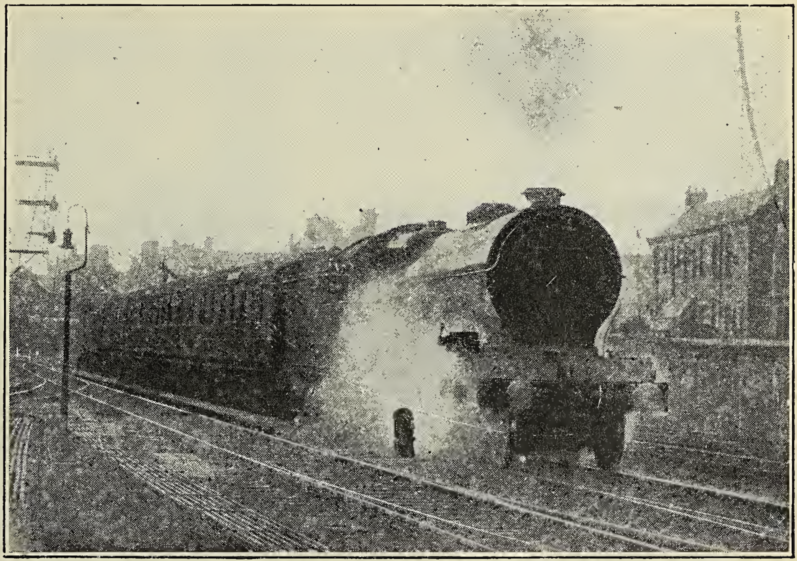
BRECHIN STATION.

On the Dundee–Forfar line, besides the through trains, there are locals from Barnhill at 8.21 a.m., and 2.2., 5.10, 9.2 (not Saturdays) and 10.5 p.m. (not Saturdays) to Dundee, and outwards trains at 1.10 (not Saturdays), 1.13 (Saturdays only), 4.50, 5.33 (to Kingennie), 8.40 (not Saturdays), and 9.45 p.m. (not Saturdays).



CARMYLLIE LIGHT RAILWAY TRAIN AT ELLIOT JUNCTION.

The Brechin–Edzell branch has trains from Brechin at 7.40, 8.45, 11.29 a.m., 1.16, 2.42 (not Saturdays), 2.47 (Saturdays only), 5.5 (Saturdays only), 5.23 (not Saturdays), 6.20 (Saturdays only), 7.25 and 9.30 p.m. (Saturdays only), and from Edzell at 8.5, 9.45, 11.52 a.m. (Saturdays only), 12.5 (not Saturdays), 1.38, 3.45, 5.48, 6.50 (Saturdays only), 8.5 and 9.53 p.m. (Saturdays only). Speaking generally, these are worked more or less as distinct from the other trains at Brechin, though in some cases the sets of coaches are intermixed and the engines rather more so. This is a rather busy branch, as Edzell is a favourite centre for the foothills of the Grampians, and attracts a good many visitors in the season. It will be appreciated that the services reviewed are those which apply during the summer months. As a matter of fact, however, the services are not greatly reduced even in winter, as many of them are standard and designed as much for local purposes and connections with trains used largely by residents and business men as for tourists and holiday travellers. Several are, in fact, standard residential trains. On the other hand, there are quite a number of trains which are mixed, though these have not been differentiated in preceding remarks. In a large number of cases the standard units are two or three bogie coach sets, two of these being run together on combined services. A



MORNING L.N.E.R. TRAIN LEAVING ARBROATH FOR ABERDEEN.

4-4-2 Locomotive No. 9869 "Bonnie Dundee."

(By courtesy of "The Arbroath Herald.")

further point of interest is that so many of the trains are worked by the familiar Caledonian 0-4-4 tank engines. So much so, that it is quite exceptional to see any other class of engine, except in the case of semi-main line services such as those between Dundee and Perth, and on the Perth–Crieff line, on which main-line engines are generally employed. Occassionally, too, as on the Forfar–Kirriemuir branch, a main-line engine may make a trip to and fro before or after a main-line working. Otherwise, in nearly every instance, the train consists of two or three bogie coaches (strengthened occasionally as need arises), worked by a 0-4-4 tank engine. Moreover, many of the engines have even more complex workings than the coach sets, while there are instances where engines and coaches are interchanged between branch services by short empty coach or light engine runs. In the main, however, train workings are shared by the engines insofar as they accord with hours of duty and engine time considerations.

On Sundays, the lines concerned are still very sparsely provided with trains, except between Aberdeen and Stonehaven, which is provided with four services in each direction. There is, in fact, one through train only each way on the main line, the 9.36 a.m. from Perth to Aberdeen, bringing the London sleeping cars, and carrying also a Glasgow and Edinburgh section, and the 1.10 p.m. return service from Aberdeen to Perth. There are, however, one or two more trains south of Perth, and as these are continued to Dundee, the branch thereto gets three non-stop trains each way from Perth at 9.40 a.m. (in connection with the London and Glasgow train mentioned), 12.5 (10.10 a.m. from Glasgow), and 5.28 (3.25 p.m. ex Glasgow) p.m. and 11.25 a.m. and 3 and 8 p.m. Several of these trains, it is interesting to note, have Pullman restaurant-car facilities. None of the other branch lines considered in this article is, however, yet provided with trains on Sundays.

In conclusion, the writer may emphasise the many interesting features of train working in this area, and the pleasure with which, by courtesy of the L.M.S.R., he undertook an exploration and examination of the sections concerned.

Photo] [*Lieut. B. D. Holberton, R.N.*

CALEDONIAN RAILWAY:

Oban-Glasgow Express near Taynuilt. 4–6–0 locomotive, No. 53.

PEEBLES TRAIN LEAVING BROUGHTON.

The Peebles Branch of the L.M.S.R.

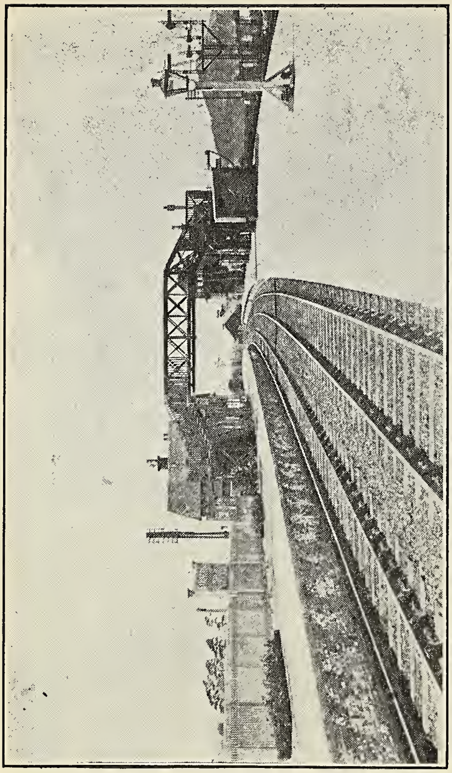
By H. C. H. MOLLER.

SITUATED on the Tweed amidst some of the finest scenery in the Southern Uplands, Peebles is a well-known Scottish health and holiday resort. The town is old, but has been greatly modernised, though a few of the older buildings still remain. The "Cross Keys" Inn dates from the 17th century, and has a close association with Sir Walter Scott, being the original of the "Cleikum" inn in "St. Ronan's Well." Part of the popularity the town now enjoys is undoubtedly due to the very convenient railway services connecting it with Edinburgh and Glasgow, and a considerable number of residents travel daily to these cities.

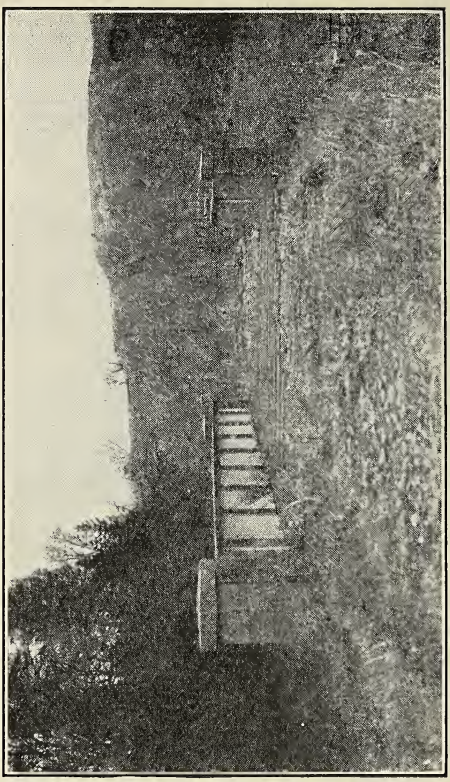
The L.N.E.R. line from Edinburgh approaches the town from the north, along the valley of the Eddleston Water, which stream enters the Tweed at Peebles, and after sweeping round the north-eastern side continues eastward down the Tweed Valley to Galashiels, where it joins the main Waverley route. The L.M.S. branch from Symington commences from a station situated on the south bank of the river, and though generally regarded as a terminus, actually has a connecting track joining it to the L.N.E.R. line. Throughout almost its entire length this line runs at a height of over 600 ft. above sea level, and passes through some magnificent scenery.

On leaving Peebles the line follows the south bank of the river for some little distance before entering a tunnel about 600 yards long in the shoulder of Cademuir Hill. Emerging from this tunnel the Tweed is crossed by a fine stone-arched viaduct from which a glimpse of Neidpath Castle, built on the crags overlooking the Tweed, is obtained. It was besieged and reduced to its present ruinous condition by Oliver Cromwell during his campaign in Scotland in 1650.

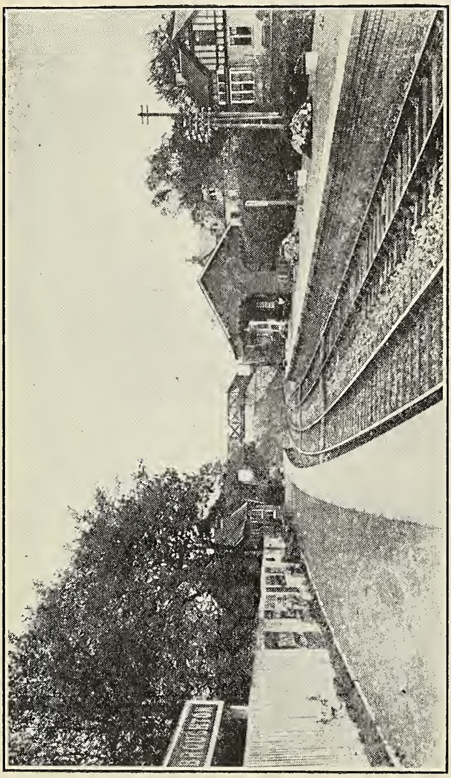
Once on the north bank the railway follows the course of the river closely to Lyne. This station closes at 5 p.m., and after that hour is used as a halt, trains stopping only to pick up or set down passengers on information being given. Three and a half miles farther up the valley Stobo station is reached. As there is no village here the station is named after Stobo Castle, which stands about half a mile to the north, and serves the castle and surrounding farmsteadings.



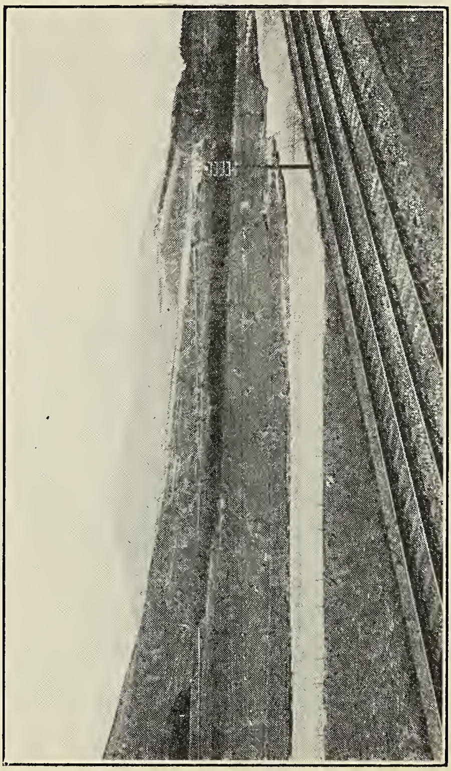
SYMINGTON STATION.



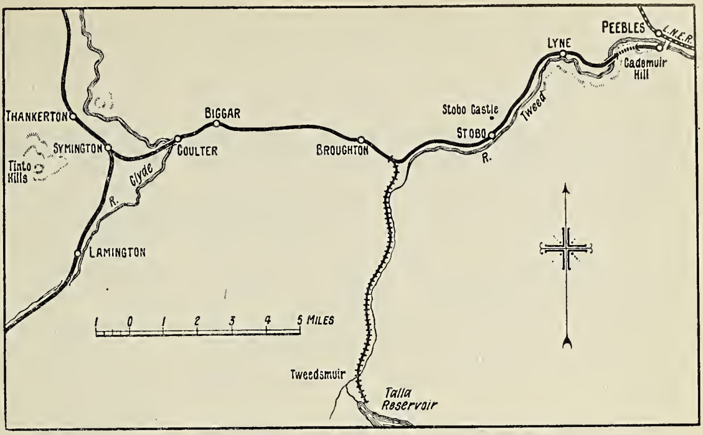
UNDERLINE BRIDGE, ON TALLA BRANCH.



BROUGHTON STATION.



TINTO AND THE CLYDE FROM MAIN LINE.



SKETCH MAP OF PEEBLES BRANCH.

Broughton station, which is next reached after a further 4½ miles, is the largest intermediate station on the line. As well as ample siding accommodation, a passing loop is provided, and in addition the down platform, shown on the right-hand side of the photograph, is an island, so that should it ever be necessary a third line could be laid round it. The station may have been designed in an optimistic moment when a large increase in local traffic was expected from this district, but more probably was enlarged because of the quantities of materials which must have been dealt with here during the construction of the Talla Reservoir.

Mention might here be made of the Talla Reservoir Railway, a contractors' line about eight miles long, which commenced at a junction with the Peebles branch about three quarters of a mile east of Broughton station.

Constructed to transport the materials and labour for the building of the Talla

L.M.S. Train Service. Symington, Biggar and Peebles Branch, July, 1927.

	M.O.			S.O.	S.	S.O.	S.	S.O.	S.	S.	S.O.	S.O.	W.O.
	a.m.												
Glasgow (Central) ..	6 45	—	10 25	12 45	2 0	2 10	4 30	4 30	4 45	5 30	5 30	9 0	9 30
Edinburgh	6 30	8 55	10 5	12 48	2 0	2 3	4 20	4 20	4 40	5 35	5 45	—	9 20
Carlisle	5*f*21	7 55	9 0	—	1 16	1 16	3*f*20	3*f*20	4 16	4 16	—	7*f*46	8*f*35
Symington leave	8 40	10 37	11 52	2 5	3 10	3 28	5 32	5 40	5 57	6 40	7 11	10 30	10 45
Coulter	8 45	10 45	11 56	2 9	3 14	3 32	5 37	5 45	6 1	6 44	7 15	10 34	10 49
Biggar	8 50	10 50	12 1	2 14	3 18	3 36	5 41	5 49	6 6	6 48	7 19	10 38	10 53
Broughton	8 59	—	12 9	2 22	3 26	3 44	—	5 57	6 14	6 56	7 27	—	—
Stobo	9 9	—	12 17	2 31	3 32	3 52	—	6 6	6 23	7 4	7 36	—	—
Lyne..	9 16	—	12 24	2 38	3 39	3 59	—	6 14	6 32	7 11	7 43	—	—
Peebles arrive	9 24	—	12 32	2 46	3 47	4 7	—	6 22	6 39	7 18	7 50	—	—

				S.O.	S.	S.O.	S.	S.O.	S.	S.O.		
Peebles leave	—	7 45	9 45	1 5	1 25	3 20	4 0	7 5	7 20	8 50	—	—
Lyne..	—	7 51	9 51	1 11	1 31	3 26	4 6	7 11	7 27	8 58	—	—
Stobo	—	7 58	9 58	1 18	1 38	3 33	4 13	7 18	7 33	9 7	—	—
Broughton	—	8 6	10 6	1 27	1 47	3 41	4 21	7 25	7 41	9 19	—	—
Biggar	7 10	8 15	10*b*22	1 36	1 56	4*e*10	4 30	7 39	7 50	9 32	—	—
Coulter	7 20	8 20	10 26	1 41	2 1	4 15	4 35	7 45	7 55	9 38	—	—
Symington	7 24	8 24	10 30	1 45	2 5	4 20	4 40	7 50	8 0	9 43	—	—
Carlisle	—	10 58	12*f*31	3 45	3 45	7 4	7 4	—	12*f* 0	1*c*10	—	—
Edinburgh	9 12	9 33	12 5	3 15	3 15	5 50	5 50	9 23	9 23	11 0	—	—
Glasgow (Central) ..	9 0	9 30	12 5	3 16	3 16	5 50	5 55	9 25	9 20	11 0	—	—

M.O.—Mondays only. W.O.—Wednesdays only. S.O.—Saturdays only.
S.—Saturdays excepted. *f*.—Connections *via* Carstairs.

Reservoir, which now supplies Edinburgh, over 32 miles away, it winds up the Tweed Valley to within six miles of its source, climbing to a height of almost 900 ft. On the completion of the reservoir the line was abandoned and afterwards dismantled, but can still be traced throughout its entire distance. Although the right-of-way is overgrown with thick shrubs and in some cases small trees, the bridges and abutments, which are all in position, are in very good condition, and show that the line, although of a temporary nature, was constructed on substantial lines.

On leaving Broughton the line continues to Biggar, 4½ miles farther on, an important little town, which, as its name (" Bygg-garhr," the barley field) implies, is the centre of a considerable agricultural area.

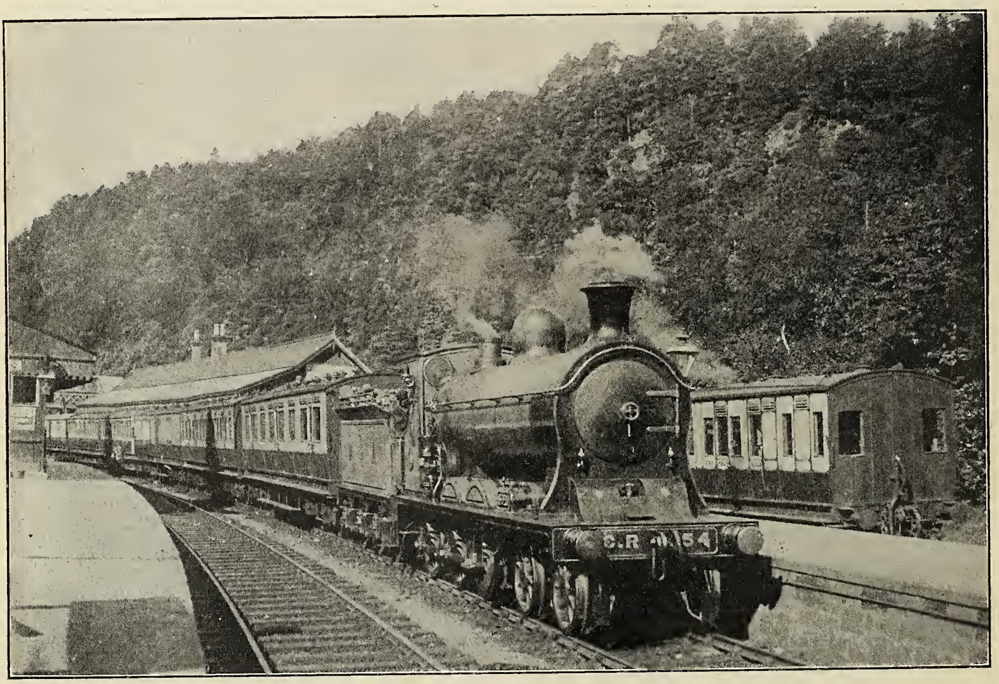
Like Peebles, it is becoming increasingly popular as a holiday resort, and has, in addition, a considerable residential population, who travel regularly to Glasgow. It may be of interest to mention that Biggar is the ancestral home of the Gladstone family.

Coulter, the remaining intermediate station, is situated where the line crosses the Clyde, two miles before Symington Junction.

The station consists of a single platform, with waiting room, &c., siding accommodation with a loading bank, and sheep pens being provided. There is no signal-box between Symington and Biggar, the starting signals at Coulter being operated from an open five-lever frame on the station platform.

Crossing the Clyde by a girder viaduct, Symington is shortly reached, and the junction with the main Glasgow-Carlisle line where the Peebles branch shares an island platform with the " up " main line.

The service at present in operation is given in a separate table, and from this it will be seen that trains stop at all stations. On Mondays an extra train leaves Symington at 10.45 a.m. for the convenience of those attending the weekly market. At the time of the writer's visit the line was being worked by two Drummond 0-6-0's, with a Drummond 4-4-0 as spare engine.



Photo] CALEDONIAN RAILWAY. [*Mr. N. Devonshire Jones.*

Oban-Euston Express in Callander Station. 4-6-0 locomotive No. 54.

Nov. 10.

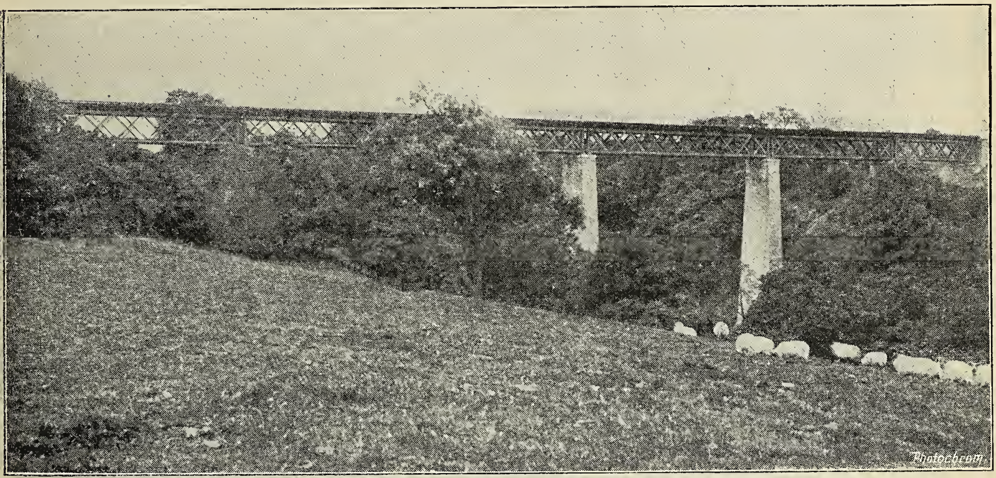
Through the Covenanters' Country by Railway.

(THE CALEDONIAN RAILWAY'S NEW LINE FROM MERRYTON JUNCTION TO STONEHOUSE.)

By W. Parker.

SO rich in stirring history and romance is almost every district in Scotland, that it would have been surprising, rather than the reverse, if, by its recent extensions in Mid-Lanarkshire and Ayrshire the Caledonian Railway had not furnished fresh facilities for reaching by railway places famed in the song and story of the land of—

> Mountain and mist, lone glen and murmuring stream,
> The shaggy forest, and the grey hillside.



LARKHALL VIADUCT.

True to the expectation of the traveller from afar, the new lines afford greater accessibility to the principal scenes of the great Covenanting struggle; and what student of British history is there who has not lingered awhile over the pages that tell of those strenuous and romantic days? But it is with less sanguinary matters that the present writer has to deal, and although the story of railway development and extension is less exciting than annals that tell of the fierce conflicts of a bygone age, and the new lines do not, as a whole, differ greatly from railways elsewhere in Scotland, one section, at least, is marked with features of no small engineering interest.

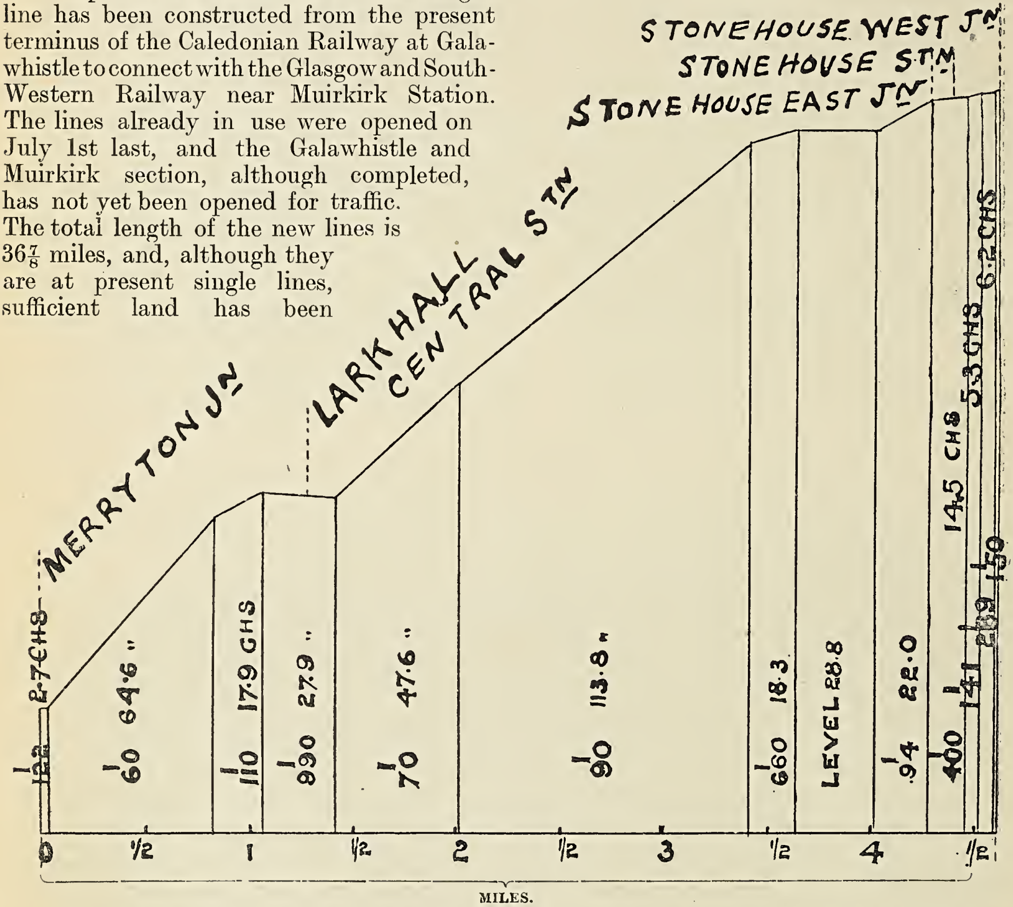
Commencing by a junction with the parent line at Alton Heights. The new railway passes through the village of Lesmahagow—where, in 1685, Colonel Rumbold, of the Rye House Plot, was arrested—linking together the termini of the Caledonian Railway at the quarrying and weaving villages of Blackwood and Stonehouse, and also the branch terminal station at Strathaven, a town long famous for its gingerbread, and now rapidly acquiring no small reputation as a most desirable residential locality. In passing, it may be interesting to recall that from Strathaven went Perley Wilson, during the Radical rising of 1820, to head a revolution at Glasgow, where he was subsequently executed.

Proceeding from Strathaven in a westerly direction the line connects with the Glasgow and South-Western Railway at the terminus of its Darvel branch line. In addition to this line there is another line of railway formed by a connection with the Caledonian Lesmahagow Branch Railway at a point about a mile north of Larkhall. This line, after passing through the town of Larkhall, joins the old Stonehouse branch at Stonehouse. To complete the extensions a small length line has been constructed from the present terminus of the Caledonian Railway at Galawhistle to connect with the Glasgow and South-Western Railway near Muirkirk Station. The lines already in use were opened on July 1st last, and the Galawhistle and Muirkirk section, although completed, has not yet been opened for traffic. The total length of the new lines is 36⅞ miles, and, although they are at present single lines, sufficient land has been acquired to permit future doubling should the growth of the traffic warrant such a proceeding. To the same end all the over-line bridges and the principal viaducts have been constructed wide enough for a double track.

The engineers had no tunnels to tax their ingenuity, and with the earthworks but few difficulties were encountered. The ruling gradient is 1 in 50, and the sharpest curve is 13 chains radius.

The section that has pride of place as possessing engineering features of special interest to RAILWAY MAGAZINE readers is that which proceeds through Larkhall and Stonehouse, and gives an alternative route between Hamilton, Stonehouse, Blackwood, Lesmahagow and Alton Heights on the south-west, and between Hamilton, Stonehouse and Strathaven on the east.

The leading features of the Larkhall and Stonehouse lines section are two viaducts, both of which span the river Avon (and are illustrated on pages 395 and 398), and an extensive cutting just north of Larkhall. The making of the cutting, which is ¾ of a mile long, with a maximum depth of 42 ft., necessitated the excavation of no less than 270,000 cubic yards of material. This task was rendered the more formidable by the circumstance that all the excavated material had to be taken out against the gradient, a distance of nearly 2½ miles, up inclines of



GRADIENT PROFILE OF THE NEW RAILWAY FROM MERRYTON JUNCTION TO STONEHOUSE.

LARKHALL (CENTRAL) STATION.

1 in 70 and 1 in 80. Added to this, a large volume of subsoil water had to be negotiated, making the work of excavation extremely heavy. The patience and perseverance of the engineers ultimately triumphed, and the completed cutting is a lasting record of their skill.

The Larkhall viaduct is a striking structure, 285 yards in length and 175 ft. in height from the river bed to rail level. It comprehends six spans of open web steel girders supported on masonry piers. The foundations of the piers are on rock at depths varying from 25 to 60 ft. below the surface of the ground. The viaduct conveys the railway in a perfectly straight line and on a gradient of 1 in 80. The piers and abutments above the level of the foundations consist of solid stonework. The freestone with which the piers were built was obtained in a quarry half-a-mile away ; but the girder-bearing blocks are of Norwegian granite. For the erection of the piers a timber service bridge was necessary, and this was built at a height of 83 ft. above the river, and on it the material was lowered and taken forward to the sites of the various piers.

Everything about the Larkhall viaduct is thoroughly modern and complete. For the purposes of inspection and painting a gangway is constructed on the underside of the bottom boom of one line of main girders, easy access to which is provided by means of ladders placed over each pier, connecting with the side platforms at rail level for the use of platelayers. Provision has been made for expansion and contraction of the main girders by having one end of each fixed, and the other movable, on cast steel bearing blocks. The fixed end is at the lower end of the gradient, thus allowing expansion to take place up the gradient. The total weight of the steel work in the superstructure of the viaduct is 1,399 tons, and the total quantity of masonry, including concrete, in the foundations, is 20,192 cubic yards.

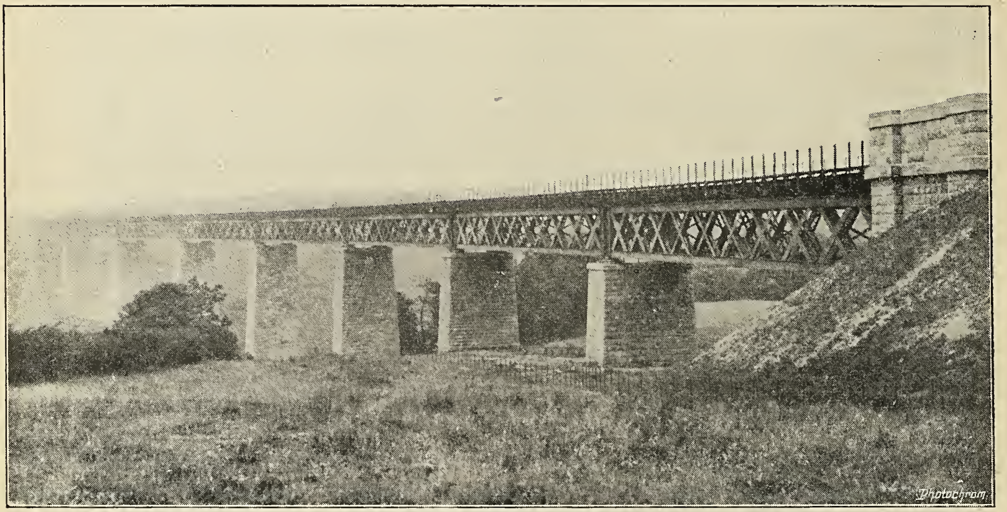
The Stonehouse viaduct, illustrated on page 398, is 407 yards in length and 158 ft. in height from river-bed to rail level. It consists of eight equal spans of open web steel girders supported on masonry piers. Unlike the Larkhall viaduct, the Stonehouse structure is not perfectly straight, as it is partly on a curve of 25 chains radius ; neither has it a gradient, being level throughout. The steel work superstructure of this viaduct corresponds with that of the Larkhall viaduct. The total weight of the steel work in the superstructure is 2,273 tons, and the total quantity of masonry, including concrete, in the foundations, is 17,359 cubic yards.

Both these monuments of engineering skill were put to severe tests last spring. Twelve heavy locomotives—which, if the world possessed a weigh-bridge large enough, would have turned the scale at about 780 tons—were formed into one train and run over the viaducts at varying speeds up to 50 miles an hour. No perceptible vibration was caused, and the tests were regarded with satisfaction by all concerned.

Illustrations of Larkhall and Stonehouse

STONEHOUSE STATION

stations are given on page 397, and these may be taken as typical of the stations on the new lines. They are well built and equipped to meet all requirements of traffic, both passenger and goods. As will be seen, on referring to the Caledonian Railway time tables, the new lines have added much to the accessibility of Mid-Lanarkshire, both from Edinburgh and Glasgow. Larkhall and Lesmahagow are both very much benefited by the extensions. At Larkhall, the new station is in the centre of the town, whereas the old one is about a mile further away. At Lesmahagow the new station is in the middle of the town; the old station is about 1½ miles from the same point. The lines provide excellent cross-country train services, and many of the villages in the district that, for all practical purposes had previously no inter-railway communication, can now enjoy social and business intercourse to an extent that must be of enormous value to the district.



STONEHOUSE VIADUCT.

As regards the development of the country served by the new lines—beyond the usual growth of business and increase in population that is always expected to follow in the wake of new railways—it may be remarked that, although there are at present no mines in the district, it is generally supposed that there is coal underground, and, as there are rich coal-bearing districts within cannon shot, the suspicion may have some justification. Be that as it may, coal or no coal, anyone having the slightest knowledge of the Caledonian Railway's enterprise, and the fostering care bestowed on the districts it serves, under the enlightened policy of the general manager, Mr. Millar, and his able colleagues, Mr. G. Calthrop, the superintendent of the line, and Mr. Archibald Hillhouse, the goods manager, will rest quite assured that everything possible will be done to make the new lines of mutual advantage to the railway proprietors and the farmers, commercial men and other residents in the "Covenanters' Country."

The original engineer for the Mid-Lanarkshire and Ayrshire Railway extensions was the late Mr. G. Graham, M.Inst. C.E., for many years engineer-in-chief to the Caledonian Railway; but they were completed by his successor, Mr. Donald A. Matheson, M.Inst. C.E., Sir John Wolfe Barry, of Tower Bridge fame, acting as consulting engineer throughout the whole course of the works. The resident engineer on that section of the work on which the two viaducts and the Larkhall cutting are situated was Mr. John W. F. Gardner, A.M.Inst. C.E., and it is to the courtesy of Mr. Matheson and of Mr. Gardner that the present writer is indebted for much of his information, and for the photographs used to illustrate this article.

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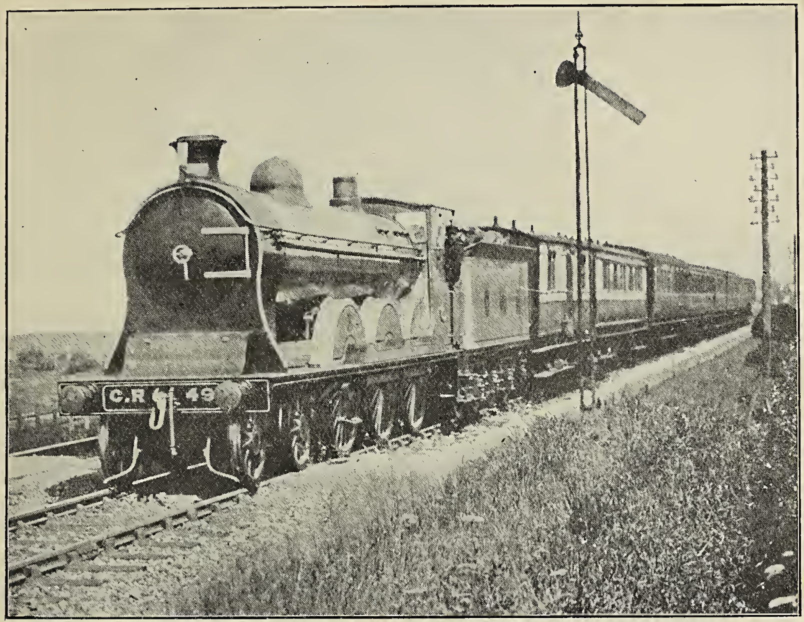
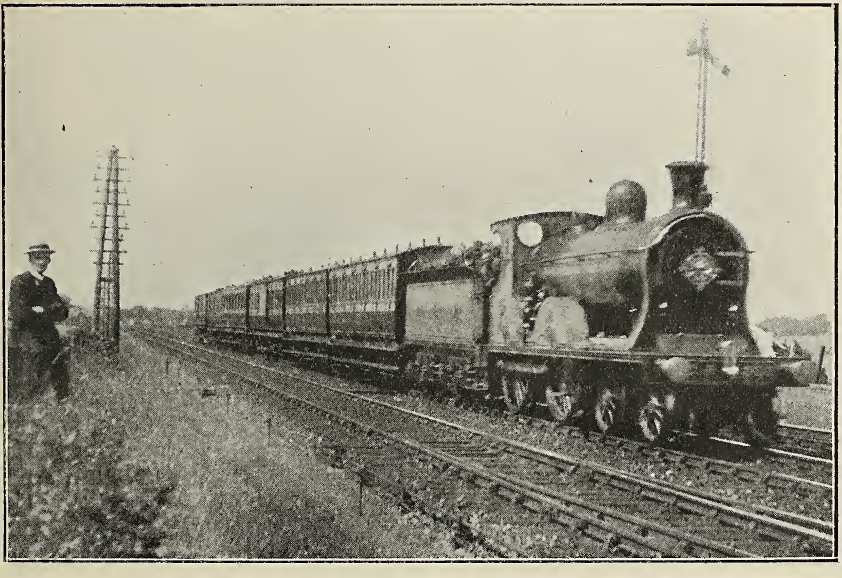


Photo] CALEDONIAN RAILWAY. [*Mr. D. C. McBean.*

1.25 p.m. Edinburgh–Glasgow train, drawn by the famous 4–6–0 Locomotive No. 49.



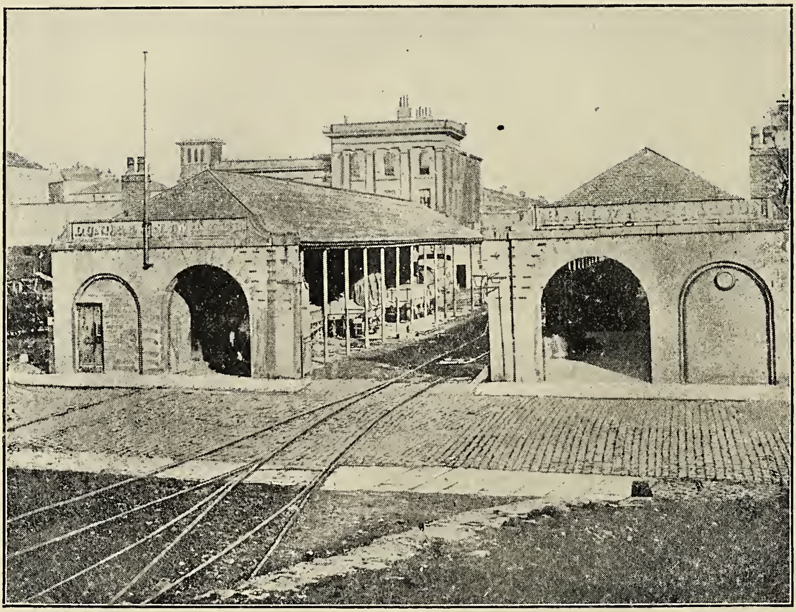
Photo] CALEDONIAN RAILWAY. [*Mr. Tom M. L. Neish.*

Glasgow-Aberdeen Express near Ardler ; 4–4–0 Locomotive No. 890.

The Dundee and Newtyle Railway.

By C. E. S. Littlejohn.

ALTHOUGH, unlike its neighbour (the Dundee and Arbroath Railway), the Dundee and Newtyle Railway has never risen to the rank and dignity of an important trunk line, and on that account is, perhaps, little more than a name to many readers of the Railway Magazine, there are, nevertheless, so many interesting facts concerning the Dundee and Newtyle Railway which are in danger of being lost in the mists of antiquity, that the writer has thought well to collect and set them down, in the hope that they may be of some little interest, not only to readers of these pages, but also to students of railway history in general.



THE DUNDEE TERMINUS OF THE DUNDEE AND NEWTYLE RAILWAY (NOW DEMOLISHED).

On May 26th, 1826, the Act authorising the construction of a railway from the town of Dundee to the village of Newtyle received the Royal Assent, and the line was accordingly constructed, and, in December, 1831, was opened for traffic.

By the Act incorporating the company, power was given to raise capital in joint stock of £30,000, and an additional sum by loan of £10,000, and by two subsequent Acts—May 29th, 1830, and July 4th, 1836—the company was empowered to raise by the first-mentioned Act an addition in joint stock of £10,000, and by loan of £20,000, and by the second-mentioned Act, an addition to joint stock capital of £100,000, making a total of £170,000.

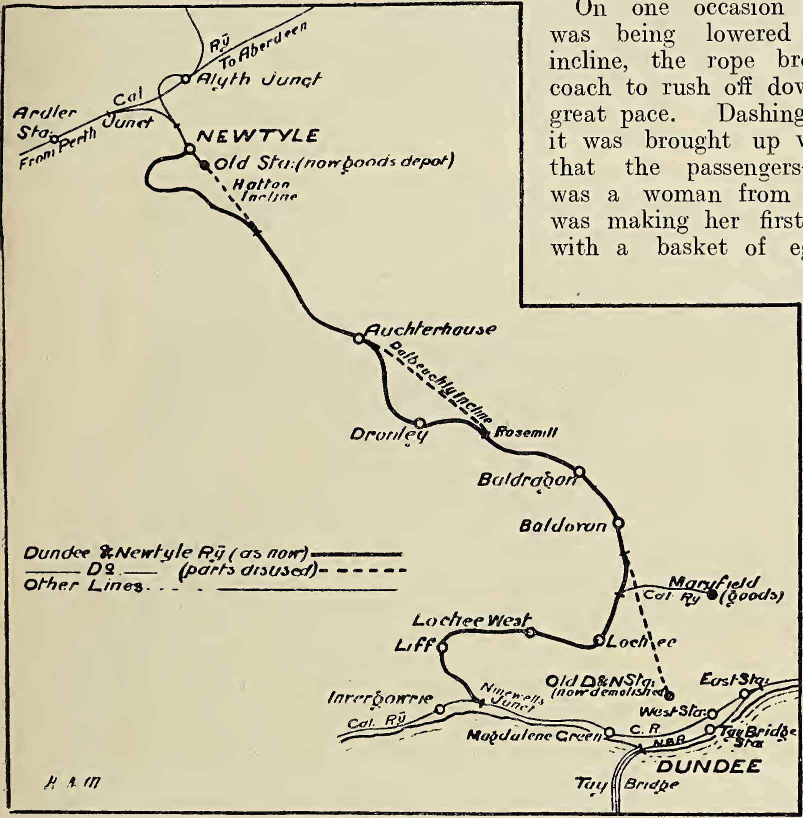
Newtyle, being situated in the vale of Strathmore, and therefore on the far side of the Sidlaw Hills, it was necessary for the line to cross that range on its way from Dundee. Accordingly those early railway promoters 'took the bull by the horns,' and, starting from Dundee, made for Newtyle as nearly as possible as the crow flies, with what results we shall see later on.

Starting from the terminus in Ward Road, Dundee, the line immediately ascended an incline of 1 in 10, up the Law, a conical-shaped hill which rises up behind the town, and which is said to be an extinct volcano!

At the top of this incline, the length of which was about 42 chains, the line entered a short tunnel, of about 330 yds. in length, 10 ft. 2 in. in height, and 10 ft. wide, cut through dislocated whinstone. This tunnel is stated to have cost about £5,000.

Emerging from the tunnel on the north

side of the Law Hill, the line ran in a northerly direction, towards the Sidlaw Hills, for a distance of about 4·75 miles, on the level. Then came the Balbeuchly incline, the gradient of which was 1 in 25 for a distance of 77·27 chains, and at the top of which was the summit level of the line. This level stretch, of 4·75 miles in length, carried the line to the top of the Hatton incline, whence it descended at a gradient of 1 in 15 for 45·45 chains to the Newtyle station.



MAP OF THE DUNDEE AND NEWTYLE RAILWAY.

The gauge of the line was 4 ft. 6½ in., and there were several curves of from 90 ft. to 500 ft. radius. The rails were of the fish-bellied pattern, some weighing 28 lbs., and others 35 lbs. to the yard, and they were secured to the chairs by means of small iron keys. The freestone blocks, upon which the chairs were placed, were 1 ft. 10 in. square, and 10 in. thick for the intermediate chairs, and 2 ft. square, and 10 in. thick for the joint chairs. The weight of the intermediate chairs was 10 lbs. each.

The rails were supplied by Longridge & Co., of the Bedlington Works, at from £12 to £18 per ton.

The inclines were worked by stationary engines and ropes, and the intermediate level planes at first by horses—when a single coach constituted the 'train'—and afterwards by locomotives. The ropes appear to have been a constant source of trouble and expense, and from all accounts the working of the inclines was at times not wholly unattended by a certain element of danger, as the following story, which is traditionally reported to be true, will show.

On one occasion as the 'train' was being lowered down the Law incline, the rope broke, causing the coach to rush off down the 'brae' at a great pace. Dashing into the station, it was brought up with such a jerk that the passengers—amongst whom was a woman from the country who was making her first journey by rail with a basket of eggs and butter—were unceremoniously thrown out upon the platform. The worthy dame gathered herself up, and, surveying the wreck of her farm-yard produce, exclaimed, "Od, sirs, I liked the ride on the railway, but they hae sic a rough way o' coupin' fouk oot, I dinna think I'll come back by eet."

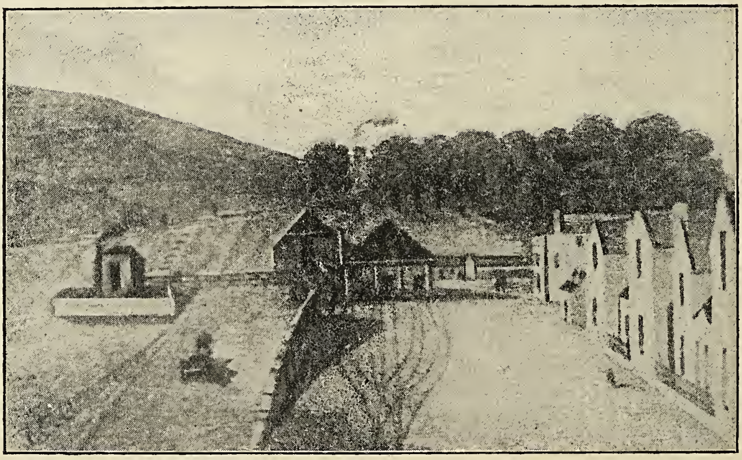
Such incidents as this, if of frequent occurrence, were hardly calculated to establish the confidence of the public in the safety of railway travelling!

The Law incline was laid as a single line from the bottom for about a third of the way up, the centre portion, where up and down trains used to cross one another, was double, and the upper portion consisted of three rails, that in the centre being common to both up and down trains. The rest of the line, including the other two inclines, was single.

The Law incline was worked by a 40-horse power high-pressure stationary engine, the cost of which was £2,750. This engine had a cylinder $21\frac{1}{8}$ in. in diameter, with a stroke of 5 ft. The rope-roll was 12 ft. in diameter, and the pinion on the fly-wheel had 32 cogs, whilst the spur-wheel on the rope-roll shaft had 97 cogs. The working pressure of this engine was 40 lbs. to the sq. in.

The ordinary loads which were taken up the incline consisted of from 20 to 24 tons including a ballast wagon of 4 tons (or as we should now call it, an incline break van), which always accompanied each train on its ascent, and was furnished with a brake and clutches for stopping the train in the event of the rope breaking.

The counterbalance was of from 10 to 12 tons in weight, the circumference of the rope was $7\frac{1}{2}$ in., and the weight was 8,960 lbs.



THE ORIGINAL STATION AT NEWTYLE, LOOKING SOUTH.

(*From an Old Print.*)

The Balbeuchly incline was worked by a 40-horse-power condensing engine, which had a cylinder of $26\frac{3}{4}$ in. in diameter, with a stroke of 4 ft. 6 in. The pinion on the fly-wheel shaft had 48 cogs, the rope-roll was 12 ft. in diameter, the spur-wheel on which had 97 cogs. The circumference of the rope was $5\frac{1}{2}$ in., the length 900 fathoms, and the weight 7,056 lbs.

The time occupied on the ascent of the Law and Balbeuchly inclines was about 6 min. each.

The Hatton incline was worked by an engine similar to that at Balbeuchly, but the pinion had only 31 cogs, and the spur-wheel 94.

All three inclines were straight, the sheaves being fixed at intervals of 6 yds. The consumption of fuel for the three engines was 85 tons per month.

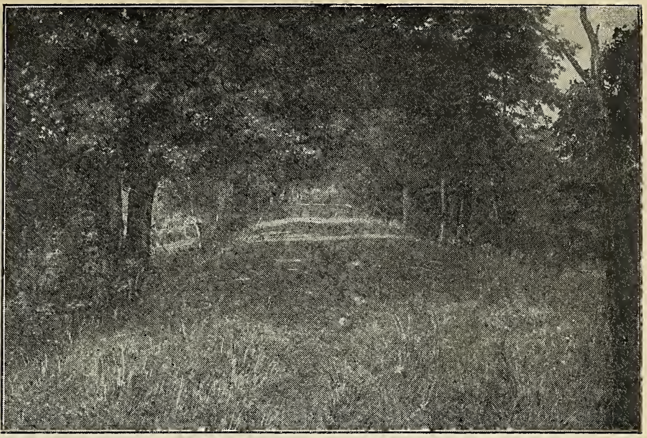
As already stated, for some considerable time after the opening of the line for traffic, the intermediate level planes were worked by horses, and it was not until the year 1833 that the first locomotive was put into service.

This event naturally created great excitement amongst the people of Dundee, the 'steam horse' being an absolute novelty in these regions. That—like all mechanical contrivances—it was looked upon with great suspicion by the ignorant and superstitious, will be seen from the following anecdote :

A certain eccentric old fisherman, Sandy Gaul by name, having been told that there was a 'steam horse' at work on the Newtyle Railway, set off from his home at Auchmithie (a fishing village near Arbroath) in order to visit Dundee that he might see this strange creature for himself. Taking up his position on the top of the Law, he soon saw the engine and train approaching from the north. In due course it disappeared into the tunnel, whereupon Sandy arose from his seat in disgust, and retraced his steps homewards. On his return he was asked by a neighbour whether he had seen the 'steam horse,' when his pent-up indignation burst forth in the following words : "It's a humbug, a perfect humbug. It puffed a', it puffed a', it cam', an' it cam', an' when it saw me it ran into a hole i' the hull an' hoded itsel'."

("It puffed, it puffed, it came and it came, and when it saw me it ran into a hole in the hill and hid itself.")

The first locomotive engine for the Dundee and Newtyle Railway, was built by Messrs. J. & C. Carmichael, of Dundee, was named *Earl of Airlie*, and was numbered 1 in the company's books. On September 20th, 1833, *Earl of Airlie* was placed on the line, and on the two following days ran trial trips. This curious old locomotive ran upon six wheels, of which the leading pair were the drivers, and behind which was a four-wheeled trailing bogie. The frames and bearings were outside. The cylinders, which were 11 in. in diameter, with a stroke of 18 in., were placed vertically on the frames at about the centre of the boiler barrel. The piston rods worked upwards through the top of the cylinder covers, and imparted motion to the driving wheels by means of bell cranks pivoted behind the cylinders, and of connecting rods from the piston rod cross-head to the leading ends of the horizontal arms, and from the lower ends of the vertical arms of the bell cranks, to a crank fitted at the end of the leading axle. The driving wheels were 4 ft. 8 in. in diameter. The valve gear was that of Messrs. J. & C. Carmichael, in which one fixed eccentric was employed for each cylinder. The weight in working order was 9 tons 10 cwt., and the cost of the locomotive, exclusive of tender, was £700.



THE BALBEUCHLY INCLINE, LOOKING TOWARDS NEWTYLE.

The cost of the tender (which was merely a four-wheeled wagon with a water butt at one end) was £30.

The next locomotive to be delivered was *Lord Wharncliffe,* which was numbered 2 in the company's books ; this engine, which was also placed on the line in September, 1833, was a sister to the *Earl of Airlie,* and was built by the same firm. On March 3rd, 1834, an additional locomotive, similar to the above, but built by Messrs. Stirling & Co., of the Dundee Foundry, was brought into service. This engine, No. 3 in the company's books, was named *Trotter.** In this connection, it is interesting to recall that the late Mr. Archibald Sturrock, whose death, at the advanced age of 92, took place at the beginning of last year, assisted in the building of, and helped to place the *Trotter* on the line, having just completed his apprenticeship with Messrs. Stirling (see RAILWAY MAGAZINE, August, 1907).

NORTH ENTRANCE TO THE LAW TUNNEL.
The mouth has been boarded up and protected by barbed wire.

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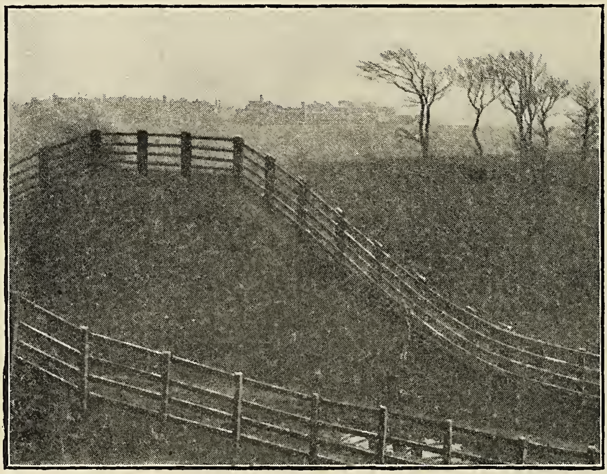
* These three interesting old locomotives cannot be said to have been the first bogie engines in this country, for in 1815, Messrs. Blackett and Hedley had—in order to prevent the breaking of plate rails on the Wylam Railway—placed two engines, which had been built as four-wheelers in 1813, on *two* separate frames or trucks of four wheels, thus making double bogie locomotives. They successfully worked the line until they were restored to their original form in 1830. However, there seems to be no doubt that in 1833–4 these were the only bogie locomotives at work in this country. Moreover, the trailing bogie was a new device, which had never before been tried anywhere.

At the end of 1835, there was ordered from Messrs. R. Stephenson & Co., of Newcastle-on-Tyne, a fourth engine, named *John Bull*, and numbered 4. This locomotive, which was delivered to the Dundee and Newtyle Railway in April, 1836, had four wheels (which were coupled), and inside cylinders.

The following were the Dimensions :—

Diameter of leading wheels ..	4 ft. 4 in.
Diameter of driving wheels ..	4 ft. 4 in.
Diameter of cylinders	11 in.
Stroke of pistons	16 in.
Length of boiler barrel	7 ft.
Diameter of boiler barrel ..	3 ft.
Number of tubes	94.
Diameter of tubes	$1\frac{5}{8}$ in.
Heating surface of tubes ..	291·68 sq. ft.
Heating surface of firebox ..	39·14 sq. ft.
Total heating surface ..	330·82 sq. ft.



DISUSED EMBANKMENT NEAR DOWNFIELD.

Its abrupt termination is explained by the circumstance that an underbridge formerly existed laterally between the two rows of fencing.

The *Earl of Airlie* and *Lord Wharncliffe* worked on the line until 1854, when they were withdrawn from service. The former was employed for some years as a stationary engine for pumping water at Errol, on the Dundee and Perth Railway, and about the end of its time there, was photographed. The latter appears to have been used for some work of the same nature, and was finally broken up at Seabraes, Dundee, where the works of the Dundee and Perth Railway were situated. The *Trotter* was withdrawn from service in 1849. It seems unfortunate that not one of these old engines should have been preserved. They were unique, and would have been of great interest to *railwayists* of the present day.

The carriage stock in 1840 consisted of first-class and 'mixed' coaches, the first-class containing three compartments holding eight persons each. The 'mixed' carriages resembled stage coaches, with the addition of an entirely open compartment before and behind. The middle compartment, which held four persons, was called 'extra first,' and the end compartment held eight persons.

The wheels were 3 ft. in diameter, and were made of cast iron, and had case-hardened tyres. The weight of each wheel was from $2\frac{1}{2}$ to $2\frac{3}{4}$ cwt., and the cost was £7 15s. per set. The first-class carriages cost from £80 to £90 each, and the mixed from £60 to £70 each. The goods stock consisted of about 110 wagons and 60 trucks, the average cost of which was about £20. It is interesting to note that at first the wagons were constructed without springs.

Here it may be well to make passing mention of the Newtyle and Coupar Angus and Newtyle and Glamis Railways. These lines, though not belonging to the Dundee and Newtyle Railway, formed a junction with it at Newtyle. They were worked by horses, although occasionally at very busy times, when traffic was more than usually heavy, the Dundee and Newtyle Railway engines were allowed to work upon them. On the Newtyle and Coupar Angus Railway there was an incline near Ardler, similar to those between Newtyle and Dundee. The following extract from a 'memorandum of coaches, wagons, wheels, axles, etc.,' which were, apparently, required for the Newtyle and Glamis Railway in August, 1837, shows that even in those early days, railways had to study economy. Amongst other things, this entry appears :

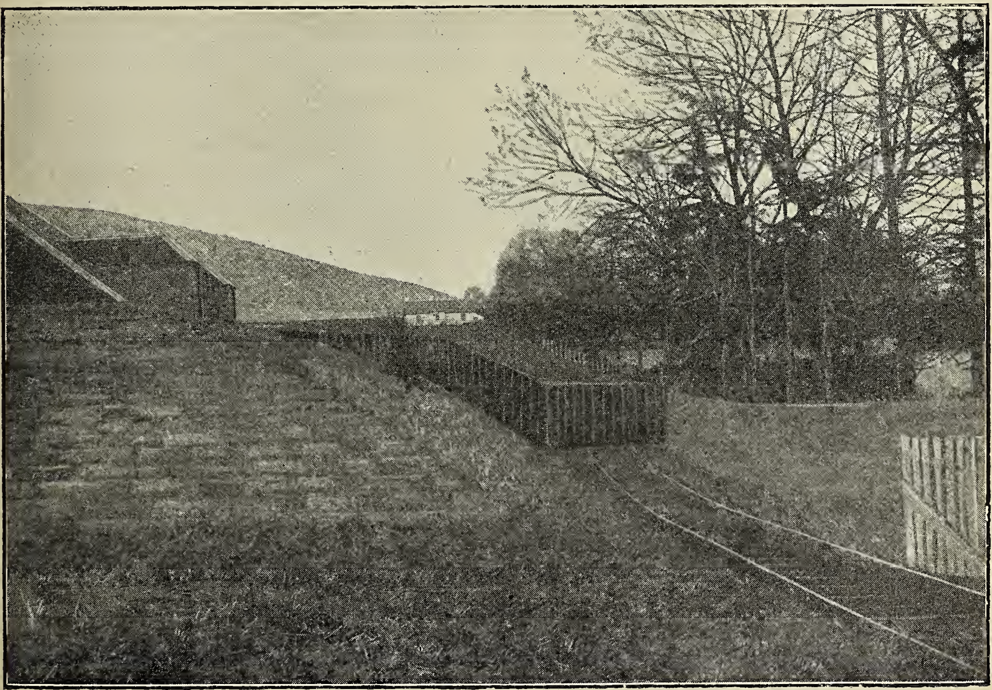
"16 long platform wagons, with raised sides for carrying grain, potatoes, flax, yarn, etc. ; and if a few of them were made on springs, would make excellent summer coaches ! ! The wagons would cost, exclusive of wheels and axles, about £10 to £10 10s., and if with springs, £5 to £6 additional."

THE RAILWAY NEAR DOWNFIELD LOOKING TOWARDS NEWTYLE.
The orginal embankment to the right, the present railway to the left.

As we shall presently see, subsequent railway development in the Strathmore district soon caused these old lines, if not to fall into disuse, to cease to exist as separate concerns, and to be swallowed up by a larger undertaking.

The traffic on the Dundee and Newtyle Railway was considerable, but the cost of maintaining the stationary engines, keeping up the ropes, and working the inclines and the line generally, was so great, that down to the year 1845, the company had not only paid no dividend, but had been unable to meet the interest of a large sum of money which had been lent by bankers on mortgage over the line. Indeed, in the years 1841–42, matters seem to have come to such a crisis, that an attempt was made by the mortgagees to take the line into their own hands, and to use it for satisfying their claims. They persisted in this attempt for several years, but the matter was at last brought to an end, and their attempt to convert the line to their own uses was frustrated.

The following advertisement, which appeared in the *Railway Times* of January 11th, 1845, gives some idea of the financial



A VIEW OF THE DISUSED HATTON INCLINE FROM THE BOTTOM.

straits into which the railway had fallen:

"RAILWAY TO BE LET.—To be let, for a period of three years, to commence on 2nd February next, or such other day as shall be agreed on, the Dundee and Newtyle Railway, including under that general name the engines, coaches, and whole conveniences and other plant of the concern; and also the extension of that railway to the Harbour and Docks of Dundee.

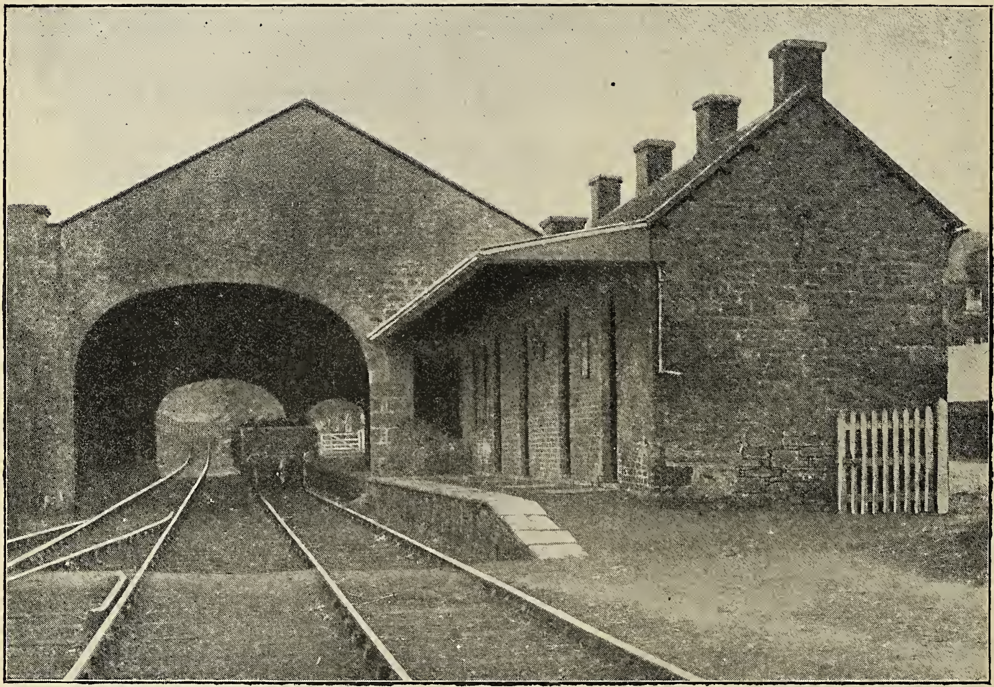
"The draft or lease containing the terms and other particulars will be ready for being exhibited on or before Friday, 10th January.

"Apply to C. Kerr and J. Kerr, Writers in Dundee.

"Sealed offers, marked 'Tender for Lease of the Dundee and Newtyle Railway,' and addressed to the Committee of Management, to be lodged with Messrs. C. Kerr and J. Kerr on or before Friday, 24th January.

"The proprietors do not engage to accept the *lowest offer. Security will be required."

About this time, however, two new railways which had been projected—the Dundee and Perth, and the Scottish Midland Junction—were both anxious to obtain possession of the Dundee and Newtyle Railway, and as the result of various meetings and proposals, not to speak of much strife and no little amount of ill-feeling, in the year 1846, arrangements were completed, and an Act obtained, by which the Dundee and Newtyle Railway was leased in perpetuity to the Dundee and Perth Railway, which then became known by the name of the Dundee and Perth and Aberdeen Junction Railway (see article on Dundee and Arbroath Railway, in the RAILWAY MAGAZINE for September, 1909).



THE OLD STATION AT NEWTYLE, NOW USED AS A GOODS DEPÔT.
The arched portion is of more recent erection. The foot of the Hatton incline can be seen in the background.

This arrangement came into force in the year 1847, upon the opening of the line from Dundee to Perth, and two years later the gauge of the Newtyle line was altered to 4 ft. 8½ in. This necessitated the conversion of the rolling stock of the Dundee and Newtyle Railway to suit the new conditions. *Earl of Airlie*, *Lord Wharncliffe* and *John Bull* were altered; but the *Trotter* appears to have been scrapped.

The line was closed for four days, from September 1st to September 5th, while the change of gauge was being carried out.

(*To be continued*).

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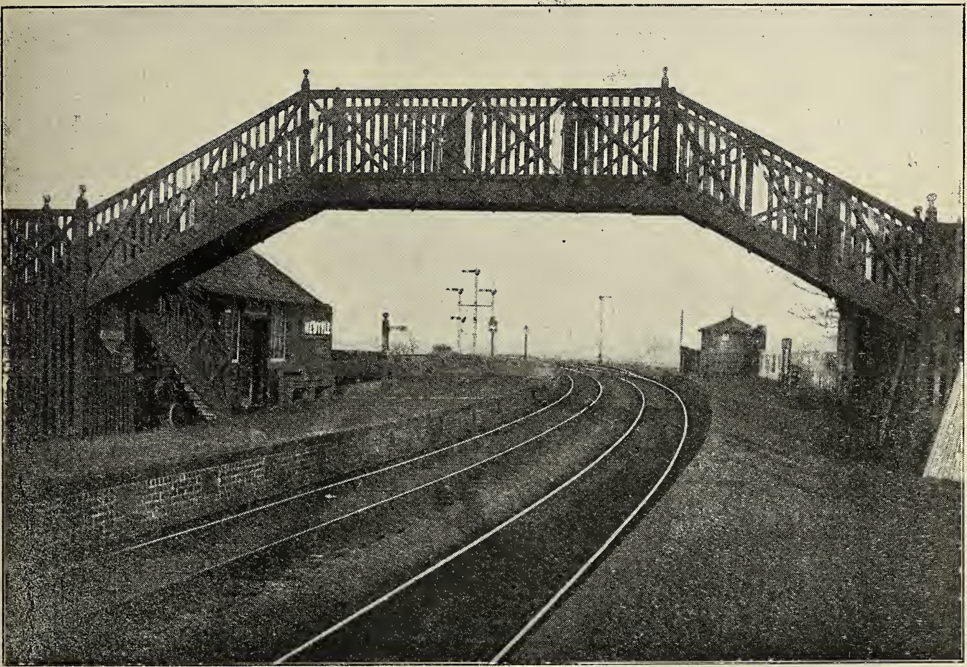
* ? highest [ED.]

The Dundee and Newtyle Railway.

By C. E. S. Littlejohn.

(*Continued from page* 108.)

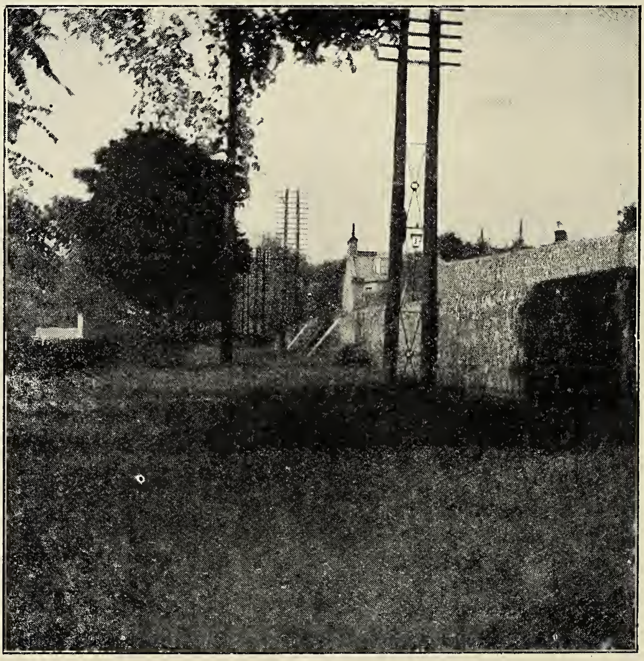
IN Dundee, communication with the Dundee and Perth, and also with the Dundee and Arbroath Railways, was effected by means of rails laid along the streets of the town, for which purpose use was made of the already existing extension to the harbour and docks.



THE PRESENT NEWTYLE STATION LOOKING TOWARDS ALYTH JUNCTION.

On September 11th, 1848, the main line of the Scottish Midland Junction Railway was opened for traffic. This company, whose line extended from that of the Scottish Central Railway at Perth, to Forfar, where it joined the Arbroath and Forfar Railway, passing on its way through Coupar Angus and Glamis, purchased the Newtyle and Coupar Angus and Newtyle and Glamis Railways, considerable portions of which it made use of in constructing its line. From Coupar Angus to Ardler the Scottish Midland Junction Railway used part of the former, and from a point eastward of Alyth Junction (then called Meigle), as far as Glamis, it made use of the latter. Shortly after the opening of the main line, a branch was made from Ardler Junction to Newtyle, which superseded the steep incline on the original Newtyle and Coupar Angus Railway, and in August, 1855, a branch from Coupar Angus to Blairgowrie, $4\frac{1}{4}$ miles distant, was opened. As regards the Newtyle and Glamis Railway, the portion between Newtyle and the Scottish Midland Railway appears to have fallen into disuse at this time.

But the Scottish Midland Railway was itself not destined to have a very long existence, for, in 1856, it was amalgamated with the Aberdeen Railway—whose line extended from Guthrie, on the Arbroath and Forfar line, to Aberdeen—under the name of the Scottish North-Eastern Railway. As the Aberdeen Railway had previously leased the Arbroath and Forfar line, this latter railway was included in the amalgamation. On June 23rd, 1864, the Scottish North-Eastern Railway was authorised to construct a railway $2\frac{3}{4}$ miles in length, from Newtyle, to join the main line at Meigle, whence a branch to Alyth, of $5\frac{1}{2}$ miles in length, had been incorporated by Act of June 14th, 1856, and opened on September 2nd, 1863; by Act of June 23rd, 1864, the Alyth branch was leased to the Scottish North-Eastern Railway. Thus was direct communication established between Dundee and Blairgowrie on the one hand, and between Dundee and Alyth on the other.



UPPER PART OF THE LAW INCLINE—NOW DISUSED.

[To avoid confusion of names, it is well to explain that Meigle was formerly the name of the station now called Alyth Junction. Meigle village is situated on the Alyth branch, about a mile from the main line, where there is now a station of the same name.]

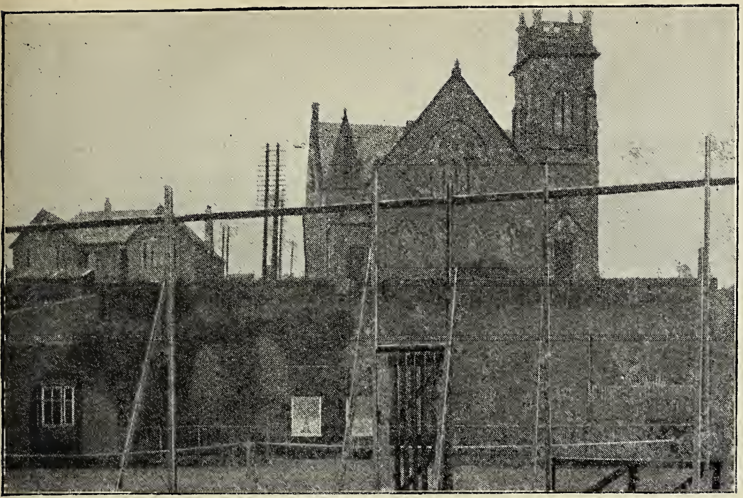
In the meantime, by Act of July 28th, 1863, the Dundee and Perth and Aberdeen Junction lines had been vested in the Scottish Central Railway, subject to an obligation to discharge all debts, to satisfy the claims of preference shareholders, and to pay to the ordinary shareholders a dividend on their shares for the year ending on July 31st, 1864, at the rate of 2 per cent., for the year ending on July 31st, 1865, at the rate of $2\frac{1}{2}$ per cent., and thereafter at the rate of 3 per cent. per annum, with right after 1866 to share the surplus profits on the transferred lines.

But the final stage of railway amalgamation had not yet reached its culminating point; it was not long, however, before it was destined to do so, for in the year 1865 the Scottish North-Eastern and Scottish Central Railways—and with them the leased Arbroath and Forfar, and Dundee and Newtyle lines—were amalgamated with the Caledonian Railway, thus bringing all the lines mentioned in this article under the control of one company.

It will perhaps not be out of place at this point to give a short description of the locomotives which worked on the Newtyle line in succession to those which have already been described.

About the year 1852, the Dundee and Perth and Aberdeen Junction Railway, having acquired the engine *Wallace*, which was built for, and worked upon the Dundee and Arbroath line from the time of the opening of that railway until 1847, put it to work on the Dundee and Newtyle line. At this time it bore the number 8. As this locomotive was described under the article on 'The Dundee and Arbroath Railway,' nothing more need be said about it here. It will, however, be remembered that the Dundee and Arbroath line was originally laid with a gauge of 5 ft. 6 in., which, of course, necessitated the locomotive in question being converted to the standard 4 ft. $8\frac{1}{2}$ in.

In or about the year 1854 three 4-wheeled engines of the 'Bury' type were at work upon the Newtyle line. They were bought second-hand, probably to supersede the two Carmichael engines, which, as we have already seen, were withdrawn from service in 1854. They were numbered 10, 11, and 12. One of these locomotives was sent for a time to work on the Carmyllie branch of the Dundee and Arbroath line, but it did



THE SOUTH ENTRANCE TO THE LAW TUNNEL AT DUNDEE.
The tunnel mouth can be seen boarded up in the right hand corner of the view. The building at the bottom, to the left, is the remains of the incline engine house.

not remain there for long, as the wheels (5 ft.) were too large for satisfactory working on that road.

Locally, the ' Burys ' were known as the ' Tods,' for what reason nobody seems to be able to offer any explanation. An engine of this type, whether one of the three mentioned above or not is rather uncertain, ended its career by bursting its boiler at Stirling.

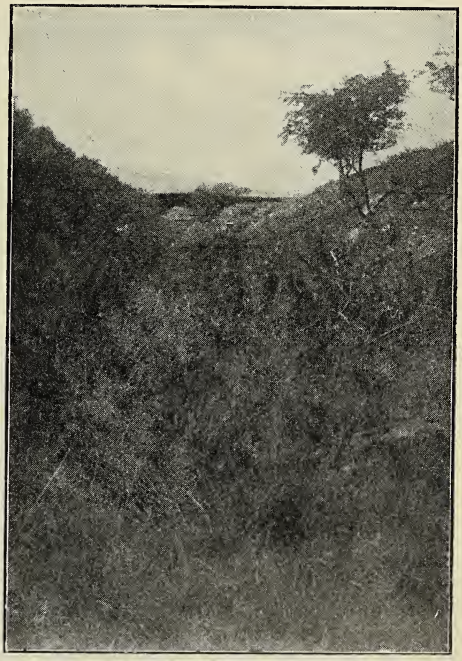
In 1860, two locomotives were built by Messrs. Stephenson & Co. for work on the Newtyle line, at a cost of £1,900 each. They were taken over by the Scottish Central Railway and were numbered 16 and 17. They were tender engines, running on 4 wheels, 4 ft. 8 in. in diameter, and coupled. The cylinders, which were outside, were 15¼ ins. by 22 ins. On the amalgamation of the Scottish Central with the Caledonian Railway, they were re-numbered 72 and 73.

One of them was at work in 1887 on the Broughty Ferry Pier branch of the Dundee and Arbroath line, and continued to be used as a shunting engine in the goods yard at Broughty Ferry for a short time after the branch was closed.

As far back as the early ' forties,' it seems to have been generally recognised that some means ought to be devised whereby the Dundee and Newtyle Railway might be made capable of being worked throughout by locomotives, thus relieving the existing slowness of transit, and reducing the enormous cost of working. About 1845 a rival company was projected, the name of which was to be the ' Dundee and Strathmore Junction Railway,' which was to be worked in connection with the Scottish Midland Railway. An elaborate prospectus was issued, which is most entertaining reading, since it shows that the promoters really imagined that, as well as superseding the Dundee and Newtyle line altogether, they would be able to develop a large through traffic between Dundee and all parts of Scotland, not to speak of England !

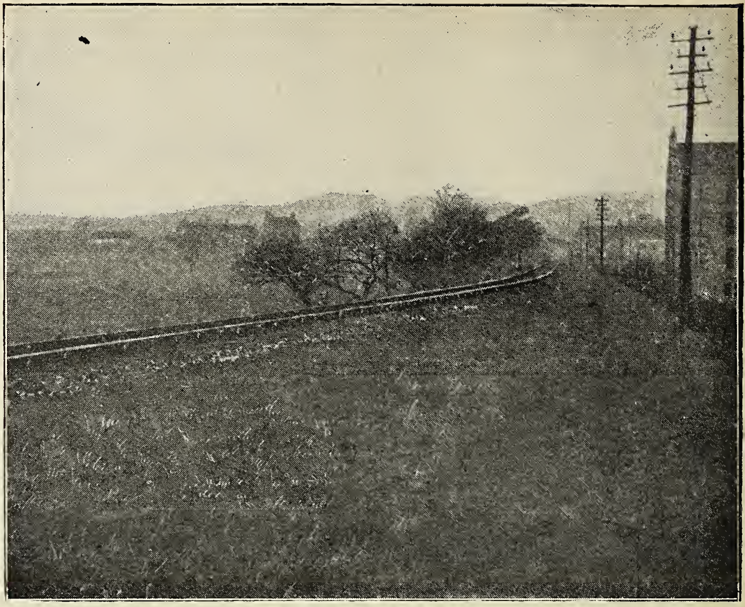
However, upon the Newtyle line being leased to the Dundee and Perth Railway, the scheme seems to have died a natural death.

Shortly after this, various other schemes began to take shape, the outcome of which was that, after the necessary formalities had



VIEW OF THE DISUSED TRACK, WITH OVERBRIDGE IN BACKGROUND, AT AUCHTERHOUSE, NEAR THE TOP OF THE BALBEUCHLY INCLINE, LOOKING TOWARDS NEWTYLE.

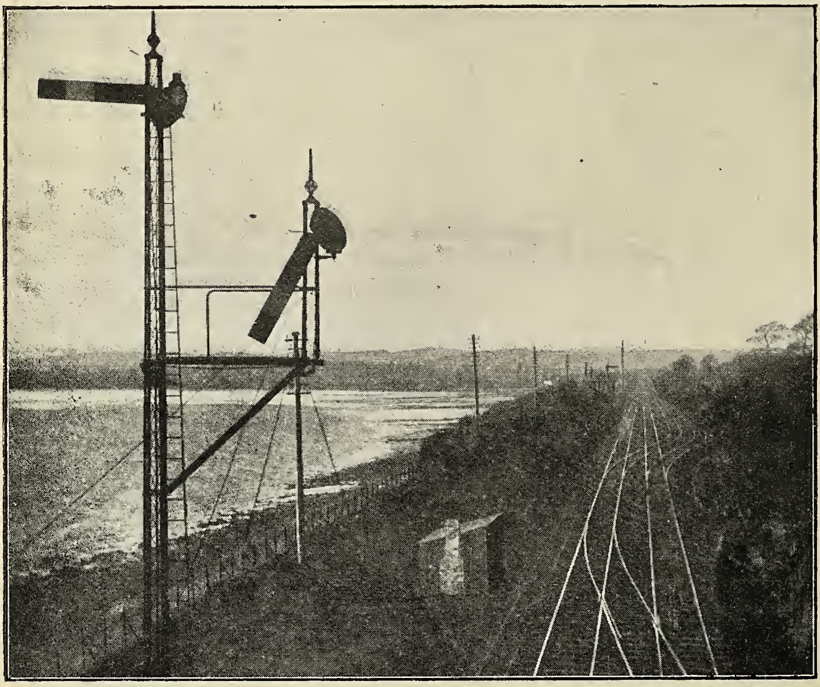
been carried through, the work of remodelling, and in a great measure re-constructing the Dundee and Newtyle line, was begun.



THE SPOT AT DOWNFIELD WHERE THE PRESENT LINE FROM NINEWELLS JUNCTION (TO THE LEFT) MERGES INTO THE ORIGINAL EMBANKMENT (TO THE RIGHT).

The first improvement to be effected was the construction of a deviating line to avoid the Balbeuchly incline. This was opened about the year 1860. In July, 1861, the Ward Road station, and with it the Law incline and tunnel, were closed for traffic. This was brought about by the construction of a line from Ninewells on the Dundee and Perth Railway (a little over 2 miles from the Dundee terminus) to join the original line near Downfield, about a mile to the north of the Law.

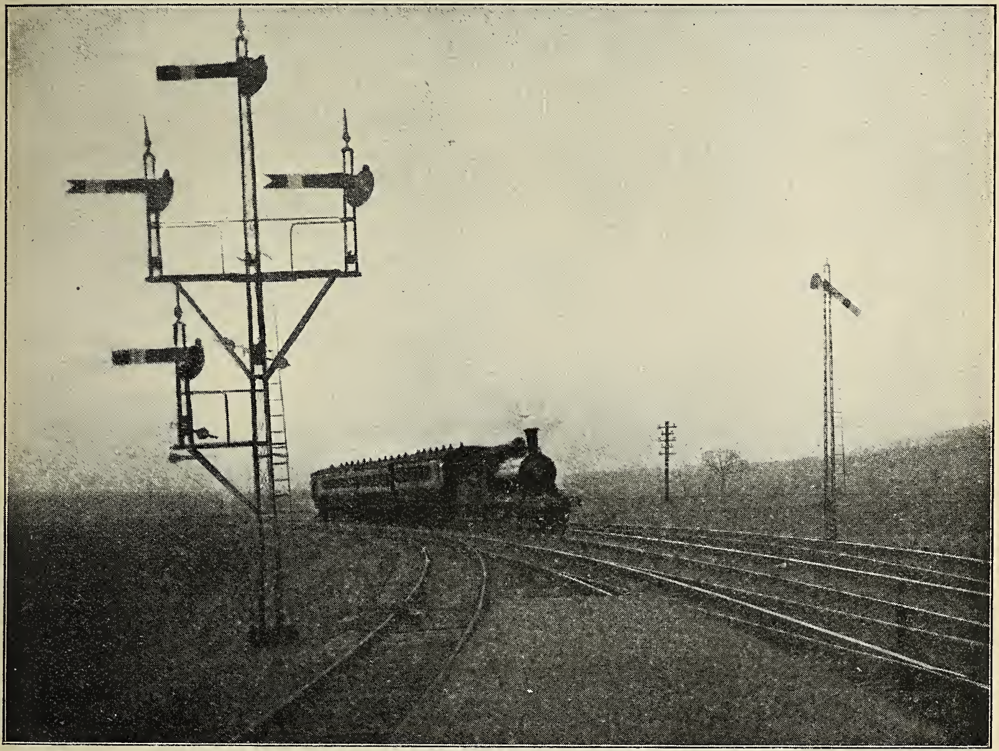
A few years later the Hatton incline was closed, together with the original station at Newtyle, a deviating line and new station having been constructed.



NINEWELLS JUNCTION, WHERE THE PRESENT NEWTYLE BRANCH (TO THE RIGHT) JOINS THE PERTH-DUNDEE LINE (TO THE LEFT).

The Ward Road terminus at Dundee has entirely disappeared, but the track of the upper part of the Law incline is still visible. The tunnel still exists, and is let to the Scottish Mushroom Company. The south entrance is boarded up, a door being placed in a convenient position for giving access to the tunnel, but the north entrance is almost completely blocked up. As it is apparently being used as a place for depositing rubbish, it seems not improbable that before very long all traces of it will be hidden from view. The embankment can be traced all the way from the tunnel to Downfield, although it has in places been removed to make way for streets and buildings. The remains of the old engine house at the south entrance to the tunnel are still standing, having been converted into a pavilion for a tennis court which now exists there. (See illustration at top of page 211.)

The course of the Dundee and Newtyle Railway at the present day is, then, as follows. Starting from Dundee West station use is made of the Dundee and Perth line of the Caledonian Railway as far as Ninewells Junction, 2 miles 31 chains from Dundee. Here the Newtyle line branches off, running round the west side of the Law and then turning eastwards through Liff and Lochee (a northern suburb of Dundee). Curving to the northward after leaving Lochee, Fairmuir Junction is reached. Here a short line branches off to the right, terminating at Maryfield and used for goods and mineral traffic only. The old embankment leading from the Law tunnel comes into view at this point, and just before reaching the next station, Baldovan and Downfield, is joined by the present line, some 7 miles from Dundee West. It is a fact worth noting that, owing to the roundabout route which it has been necessary to take to avoid the steep incline, as the crow flies the actual distance from Dundee West is little more than 2 miles. The gradient from Ninewells to Downfield is 1 in 67. Following the course of the original line through Baldovan and Downfield, and the next station, Baldragon (8¾ miles from Dundee), Rosemill signal-box is reached. Here the Balbeuchly deviation begins, the present line ascending at a gradient of 1 in 74 for a distance of about 4 miles to Auchterhouse, the summit of the line (12 miles 37 chains from Dundee). Just after leaving Auchterhouse station, the course of the old line, which has been visible on the right for about a quarter of a mile, is joined again, and is made use of for about 2 miles on the level. Just before reaching the 12th mile-post from Ninewells (14¼ from Dundee) the line curves to the westward and begins to descend at a gradient of 1 in 60, which continues more or less all the way to Alyth Junction. Meanwhile the old track runs



TRAIN FROM BLAIRGOWIE ENTERING NEWTYLE STATION.
The line to the old station can be seen in the background to the right.

straight ahead to the top of Hatton incline. This last deviation was the most difficult to construct, owing to the fact that a considerable cutting had to be made through rock. The present Newtyle station is situated between 2 and 3 miles from the top of the bank, and 16 miles 61 chains from Dundee. The line on leaving Newtyle station continues to descend to Newtyle Junction cabin, where the Coupar Angus and Alyth lines diverge. Here also the line is joined by that leading from the old station now used as a goods depôt, and situated at right angles to the present station.

The Dundee and Newtyle line is single, and is worked on the Tablet system, the Tablet stations being Ninewells Junction, Liff Lochee, Fairmuir Junction, Rosemill, Auchterhouse, and Newtyle, at all of which places loops are provided for the crossing of trains.

The passenger traffic is limited to some six or seven trains daily in each direction, most of which run between Dundee and Blairgowrie. One however, is run between Dundee and Alyth. A service of trains is also run between Newtyle and Alyth.

At present the trains are worked by the 4–4–0 outside cylinder class of locomotive, built in 1882 for work on the Callander and Oban line, but which have since been superseded on that road by Mr. J. F. McIntosh's 4–6–0 '55' class. They were rebuilt in 1900, and still appear to be capable of dealing with the heavy gradients on the line.

Of local traffic in the districts of Dundee served by the Newtyle line there is none, as owing to the circuitous route which it was necessary to adopt in avoiding the Law incline, the upper parts of the town are more quickly reached by tram, and in some cases even on foot. However, the goods traffic between Dundee, Lochee, and the Fairmuir branch is heavy, and to work it expeditiously, one of Mr. McIntosh's 0–8–0 tanks is stationed at Dundee.

The thanks of the writer are due to Mr. Cecil J. Marquis, the secretary of the Dundee and Newtyle Railway, for the kind manner in which he has placed at the writer's disposal many old records of the line, and also to Mr. John Cox, of the Caledonian Railway, for much valuable information as to the working of the Dundee and Newtyle Railway in its, one may almost be permitted to say, prehistoric days.

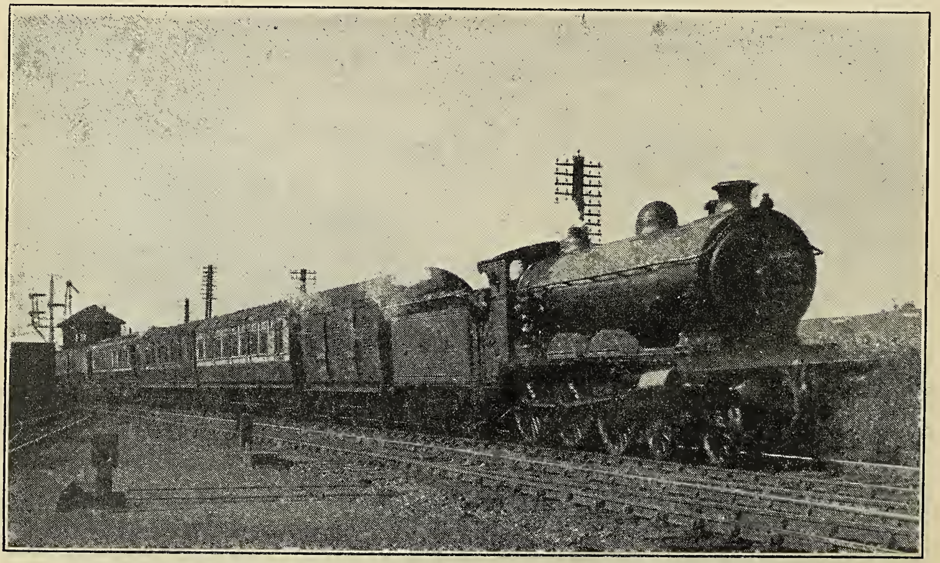


Photo.] **CALEDONIAN RAILWAY.** [*F. E. Mackay.*

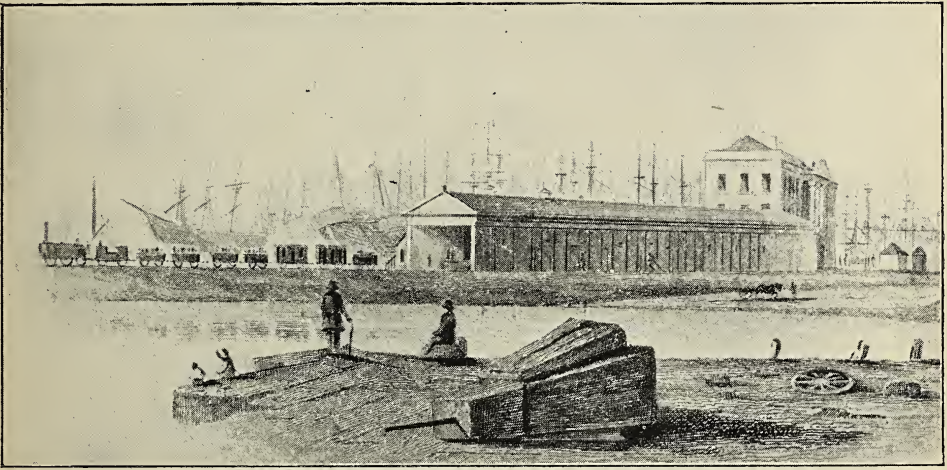
Glasgow–Liverpool express approaching Carlisle. Pickersgill 4-6-0 superheater engine, No. 62.

The Dundee and Arbroath Railway.

By C. E. S. Littlejohn.

As no account of this interesting, and in some ways, unique, section of the East Coast route from London to Aberdeen has ever appeared in the pages of the Railway Magazine, the following summary of the history and development of the Dundee and Arbroath Railway will be of interest to *railwayists*, and others.

The Dundee and Arbroath Railway, which now forms a very important link in the North British Railway's route to the North, was incorporated by Act of Parliament in the year 1836, and the line was opened from Arbroath to Craigie—slightly more than two miles from the present Dundee terminus—on October 6th, 1838.



THE OLD TRADES LANE STATION AT DUNDEE.
(*From an old print.*)
At Dundee the Railway when built was carried on an embankment, which was constructed practically in the river. This embankment was about a mile in length, and there were culverts at intervals all the way along. Since then much of the land has been reclaimed, and the water in the foreground of the illustration has given place to a busy thoroughfare. The present terminus stands near the left-hand corner of the illustration.

On June 3rd, 1839, an extension to Roodyards, about a mile nearer Dundee, was opened, and on April 1st of the following year, the entire line was brought into use, the terminus being situated in Dock Street, near the foot of Trades Lane, Dundee. The section of the line from Roodyards to Trades Lane was built by the Dundee Harbour Trustees, and was leased to the railway company for its sole use. This arrangement held good until the year 1907, when it became the entire property of the railway companies, by virtue of an agreement which had been entered into during the previous year.

The line was double throughout, and was laid partly with stone blocks and partly with cross sleepers.

An Act obtained in 1846 authorised two further undertakings; one a branch from Broughty Ferry to Broughty Pier, and the other a line to make a direct connection at Arbroath with the Arbroath and Forfar Railway.

When the Dundee and Arbroath line was opened, the terminus at the latter place was situated near the harbour, in the district of the town known as Ladyloan, while that of the Arbroath and Forfar line was close to the site of the present station. The two stations were connected by a railway laid along the street, and passengers were conveyed from the one to the other by means of a horse-drawn carriage. However, this was found to be a very inconvenient method of communication, and so the above-mentioned connecting line, leaving the original railway at a point near Elliot, running inland, and joining the Arbroath and Forfar line close to that company's station, was constructed, and was opened in 1848. A new station was built, common to both railways, which is practically the Arbroath station of the present day. At the same time the Ladyloan terminus was closed, and also the line leading to it. The old station is still standing, having been converted into dwelling houses, and the track of the old line still exists, although the rails have long ago been taken up.

The station buildings are illustrated on page 215, and the disused track at the top of page 213.

After having gone through various amalgamations, the Dundee and Arbroath Railway is now the joint property of the Caledonian and North British Railways, and, under the name of the Dundee and Arbroath Joint Railway, forms part of the main line along which traffic, both of the East Coast and Midland railways, passes on its way from London to Aberdeen.

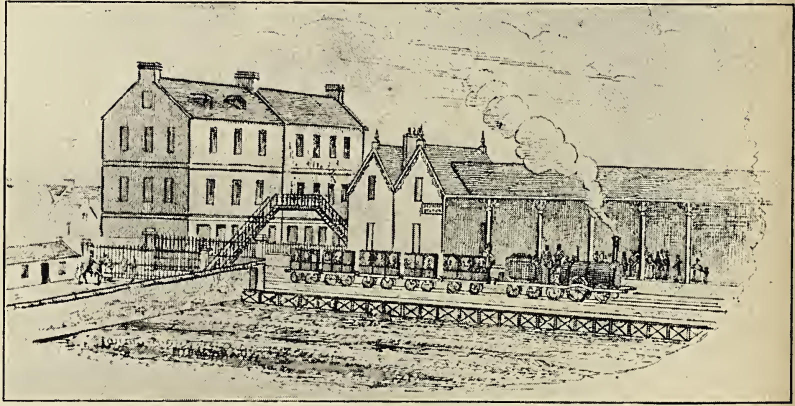
As originally laid, the Dundee and Arbroath Railway was of 5 ft. 6 in. gauge, as was also the Arbroath and Forfar line, and in this connection the following paragraph from Wishaw's "Railways of Great Britain and Ireland" (2nd edition, published in 1842), is worth quoting.

"Messrs Grainger and Miller, under whose directions the Dundee and Arbroath Railway was constructed, are among the few engineers who have ventured upon a new gauge. This is the more remarkable, as they had already used, on three other railways in Scotland, a gauge even less than 4 ft. 8½ in. We object to any alteration of gauge, where a line is likely to become a link of any long chain of railway communication already established; but whether this railway is likely in future years to be so circumstanced, we have not at present the means of judging."

In 1847, five years after this paragraph appeared, the gauge of the Dundee and Arbroath Railway, as well as that of the Arbroath and Forfar line, was altered to the now standard 4 ft. 8½ in., so that traffic might be interchanged with the Dundee and Perth Railway which was opened in that same year.

This interchange of traffic was effected by means of horse haulage, over a street railway of about half a mile in length, which was constructed for the purpose along the North Quay of the Harbour by the Dundee Harbour Trustees, under the Dundee and Perth Railway Act of 1845, and connected the station at Trades Lane with that of the Dundee and Perth Railway which was situated close to the site of the present Caledonian Railway station (Dundee West).

The Act of 1845 further stipulated that in the event of the harbour trustees failing to construct the line, the railway should do so, and obtain repayment of the expense from the trustees.



BROUGHTY FERRY STATION IN THE "FORTIES."
(From an old print.)
It will be noticed that the train—which is going towards Dundee—is running on the right-hand metals.

The line still exists, now being extensively used for harbour traffic. Vehicles are still conveyed along it from one station to the other, although most of the through traffic goes *viâ* the North British Railway tunnel, reference to which will be made later on.

On July 22nd, 1848, the Dundee and Perth Railway (Dundee Junction Act) received the royal assent. This Act authorised the construction of a railway across Dundee to connect the Dundee and Perth with the Dundee and Arbroath line. This railway was to be on a high level, and was to cross the various streets of the town on arches. This Act, however, was repealed by a subsequent Act, and powers were given to the Dundee and Arbroath Railway to build the present Dundee East station, that at Trades Lane having become inadequate for the increased traffic.

The original locomotives employed on the Dundee and Arbroath Railway were similar to those of the Arbroath and Forfar line, with outside cylinders, 13 in. in diameter by 18 in. stroke, and six wheels, of which the driving were 5ft., and the leading and trailing 3 ft. 6 ins. in diameter. The frames and bearings were inside.

These engines were named "Wallace," "Griffin," "Fury," and "Rapid."

According to Wishaw's book, quoted previously, the steam was not allowed to "blow off to waste," but was admitted into the tank of the tender to heat the feed-water.

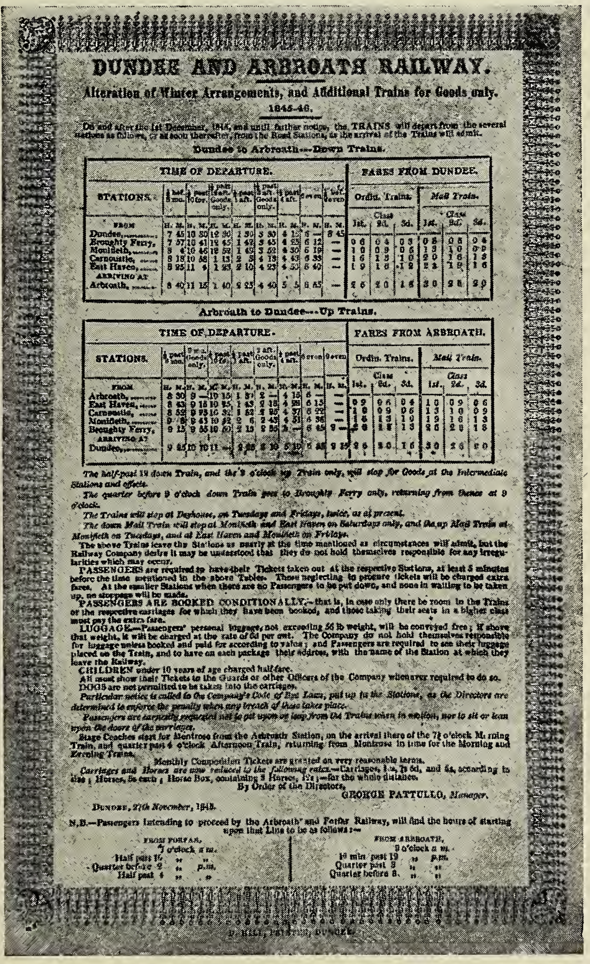
The carriages were of three kinds, first class, mixed, and third class, and, like those on the Liverpool and Manchester Railway, were named after the manner of the stage coaches of the day.

The first class carriages were named, "Antiquary," "Panmuir," "Broughty Castle," and "Patrick Robertson"; the mixed, "Antelope," "Stag," "Dolphin," and "Eagle,"; and the third class "Orchultree," and ' Mucklebacket."

Passengers' luggage was carried in vans provided for the purpose.

During the whole of the 5ft. 6 in. period, the trains used to run on the right hand set of metals instead of on the left as is now the custom.

The accompanying photograph of an old time table of the Dundee and Arbroath Railway gives some interesting information as to running of the trains, and passenger fares in the years 1845-46.



DUNDEE AND ARBROATH RAILWAY.

Alteration of Winter Arrangements, and Additional Trains for Goods only.

1845-46.

On and after the 1st December, 1845, and until further notice, the TRAINS will depart from the several stations as follows, or as soon thereafter, from the Road Stations, as the arrival of the Trains will admit.

Dundee to Arbroath—Down Trains.

STATIONS.	¼ bef. 8 mn.	¼ past 10 for.	½ past 12 aft. Goods only.	½ past 1 aft.	½ past 3 aft. Goods only.	¼ past 4 aft.	Seven	¼ bef. Seven	FARES FROM DUNDEE. Ordin. Trains. Class 1st.	2d.	3d.	Mail Train. Class 1st.	2d.	3d.
FROM	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.						
Dundee,	7 45	10 30	12 30	1 30	3 30	4 15	6 —	6 45						
Broughty Ferry,	7 57	10 41	12 45	1 42	3 45	4 23	6 12	—	0 6	0 4	0 3	0 8	0 5	0 4
Monifieth,	8 4	10 46	12 52	1 49	3 52	4 30	6 19	—	1 0	0 9	0 6	1 3	1 0	0 9
Carnoustie,	8 18	10 58	1 13	2 3	4 13	4 43	6 33	—	1 6	1 3	1 0	2 0	1 6	1 3
East Haven,	8 25	11 4	1 23	2 10	4 23	4 53	6 40	—	1 9	1 6	1 2	2 4	1 9	1 6
ARRIVING AT Arbroath,	8 40	11 15	1 40	2 25	4 40	5 5	6 55	—	2 6	2 0	1 6	3 0	2 6	2 0

Arbroath to Dundee—Up Trains.

STATIONS.	¼ past 8 mn.	9 m. Goods only.	¼ past 10 fo.	¼ past 1 aft.	2 aft. Goods only.	¼ past 4 aft.	Seven	Seven	FARES FROM ARBROATH. Ordin. Trains. Class 1st.	2d.	3d.	Mail Train. Class 1st.	2d.	3d.
FROM	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.						
Arbroath,	8 30	9 —	10 15	1 15	2 —	4 15	6 —	—						
East Haven,	8 43	9 18	10 25	1 43	2 18	4 28	6 13	—	0 9	0 6	0 4	1 0	0 9	0 6
Carnoustie,	8 52	9 23	10 32	1 52	2 25	4 37	6 22	—	1 0	0 9	0 6	1 3	1 0	0 9
Monifieth,	9 8	9 43	10 42	2 6	2 43	4 51	6 36	—	1 6	1 3	1 0	1 9	1 6	1 3
Broughty Ferry,	9 15	9 55	10 50	2 13	2 55	5 —	6 45	9 —	2 0	1 6	1 3	2 6	2 0	1 6
ARRIVING AT Dundee,	9 25	10 10	11 —	2 25	3 10	5 10	6 55	9 15	2 6	2 0	1 6	3 0	2 6	2 0

The half-past 12 down Train, and the 2 o'clock up Train only, will stop for Goods at the Intermediate Stations and effects.

The quarter before 9 o'clock down Train goes to Broughty Ferry only, returning from thence at 9 o'clock.

The Trains will stop at Dryhouse, on Tuesdays and Fridays, twice, as at present.

The down Mail Train will stop at Monifieth and East Haven on Saturdays only, and the up Mail Train at Monifieth on Tuesdays, and at East Haven and Monifieth on Fridays.

The above Trains leave the Stations as nearly at the time mentioned as circumstances will admit, but the Railway Company desire it may be understood that they do not hold themselves responsible for any irregularities which may occur.

PASSENGERS are required to have their Tickets taken out at the respective Stations, at least 5 minutes before the time mentioned in the above Tables. Those neglecting to procure tickets will be charged extra fares. At the smaller Stations when there are no Passengers to be put down, and none in waiting to be taken up, no stoppage will be made.

PASSENGERS ARE BOOKED CONDITIONALLY,—that is, in case only there be room in the Trains or the respective carriages for which they have been booked, and those taking their seats in a higher class must pay the extra fare.

LUGGAGE.—Passengers' personal luggage, not exceeding 56 lb weight, will be conveyed free; if above that weight, it will be charged at the rate of 6d per cwt. The Company do not hold themselves responsible for luggage unless booked and paid for according to value; and Passengers are required to see their luggage placed on the Train, and to have on each package their address, with the name of the Station at which they leave the Railway.

CHILDREN under 10 years of age charged half-fare.

All must show their Tickets to the Guards or other Officers of the Company whenever required to do so.

DOGS are not permitted to be taken into the carriages.

Particular notice is called to the Company's Code of Bye Laws, put up in the Stations, as the Directors are determined to enforce the penalty when any breach of these takes place.

Passengers are earnestly requested not to get upon or leap from the Trains when in motion, nor to sit or lean upon the doors of the carriages.

Stage Coaches start for Montrose from the Arbroath Station, on the arrival there of the 7¾ o'clock Morning Train, and quarter past 4 o'clock Afternoon Train, returning from Montrose in time for the Morning and Evening Trains.

Monthly Composition Tickets are granted on very reasonable terms.

Carriages and Horses are now reduced to the following rates.—Carriages, 1os, 7s 6d, and 5s, according to size; Horses, 5s each; Horse Box, containing 3 Horses, 12s;—for the whole distance.

By Order of the Directors,
GEORGE PATTULLO, *Manager.*

DUNDEE, *27th November*, 1845.

N.B.—Passengers intending to proceed by the Arbroath and Forfar Railway, will find the hours of starting upon that Line to be as follows:—

FROM FORFAR.			FROM ARBROATH.		
7 o'clock	a m.		9 o'clock	a m.	
Half past 11	"	"	10 min past 12	"	p.m.
Quarter before 2	"	p.m.	Quarter past 3	"	"
Half past 4	"	"	Quarter before 8.	"	"

D. HILL, PRINTER, DUNDEE.

Facsimile OF PUBLIC TIME TABLE ISSUED BY THE DUNDEE AND ARBROATH RAILWAY IN 1845, SHOWING GOODS AS WELL AS PASSENGER TRAINS.

Before the opening of the railway between Dundee and Perth, an agreement was entered into for leasing the Dundee and Arbroath, as well as the Dundee and Newtyle line, to the Dundee and Perth Railway, the combination being known as the Dundee and Perth and Aberdeen Junction Railway. Subsequent to this agreement, the Caledonian Railway entered into a like agreement for leasing these lines. The agreement with the Caledonian Railway does not appear to have lasted for very long, and in the year 1850, the agreement with the Dundee and Perth and Aberdeen Junction Railway was also dissolved so far as the Dundee and Arbroath Railway was concerned, as from March 9th of that year.

From that date, therefore, the Dundee and Arbroath Railway again became a separate undertaking, and so it remained until 1862, when it was amalgamated with another line—the Scottish North Eastern —which railway was itself amalgamated with the Caledonian Railway in the year 1866.

Thus the Dundee and Arbroath Railway came for the second time into the hands of the

Caledonian Railway, but on February 1st, 1880, it underwent a further change of ownership, and became the joint property of the Caledonian and North British Railways, the latter having, on the building of the Tay Bridge, acquired a joint interest in the undertaking, by virtue of the North British Act of 1879.

The line then became known as the Dundee and Arbroath Joint Railway, and it is managed by a committee with separate manager and staff, the headquarters being at Dundee.

At the time of the amalgamation of the Dundee and Arbroath line with the Scottish North Eastern Railway, the number of locomotives possessed by the former company was nine, a list of which, with the few particulars which we have been able to obtain is subjoined :

No.	Class of Work.	No. of Wheels.	Single or Coupled.	Cylinders.	Remarks.
1	Passenger	6	Single	Inside	Both built by Kinmond, Hutton and Steel, Dundee. These engines were of pattern commonly adopted about the year 1850, with double frames and outside bearings for all axles. Brass covered dome about centre of boiler ; barrel and safety valves on fire-box casing.
2	do.	do.	do.	do.	
3	do.	do.	do.	Outside	Both originally belonged to Caledonian Railway, one being built at Greenock, by the Caledonian Railway Company, and the other by Vulcan Foundry Company in 1847.
4	do.	do.	do.	do.	
5	Goods	do.	4-coupled	Inside	Built by Kinmond, Hutton and Steel, Dundee, and were very much like Nos. 1 and 2, but were coupled in front.
6	do.	do.	do.	do.	
7	Passenger	do.	Single	do.	Same as Nos. 1 and 2.
8	Local trains	4	coupled	do.	Built by Hawthorn, of Leith. Outside frames and axle bearings. No. 9 usually, but not invariably, ran without coupling rods. No. 8 had a dome of the then usual shape, but No. 9 had a large dome with flat topped cover. Otherwise these two engines were the same in appearance.
9	do.	do.	do.	do.	

All these engines became the property of the Scottish North Eastern Railway on the amalgamation of 1862, and under different numbers, ran for a considerable time afterwards.

The two four-wheeled engines, Nos. 8 and 9, never ran on main line trains, but were employed in working local trains from Dundee to Broughty Ferry, and on the Broughty Ferry Pier branch from Broughty Junction to the Pier at which passengers from Edinburgh, by the Edinburgh, Perth and Dundee line, were landed by steamers plying between Broughty Ferry and Ferry-Port-on-Craig, now known as Tayport.

It is now time to give a short account of this branch to Broughty Ferry Pier. The original Pier branch was that authorised by the Act of 1846 referred to above, and it was opened about the year 1848.

It left the main line at a point about midway between Broughty Ferry station and the present Broughty Junction, the junction being a facing one for trains coming from Dundee. By means of a sharp curve the line reached the Pier station.

At that time no goods trains were taken over the Ferry, and this branch was quite suitable for the passenger trains then running, but when goods boats for carrying the wagons across the Ferry, similar to those employed between Granton and Burntisland (*see* RAILWAY MAGAZINE; September, 1899), were brought into service in the year 1851, it was found that unless the tide was high, and the movable cradle, over which the trucks were run on to the boat, was at its highest point, the abovementioned curve was too sharp for practical use, and in consequence the trains continually left the rails.

In order to remedy this defect, the reconstruction of the branch was taken in hand, and this involved an almost entirely new line, which is the one existing (though not in use) at the present day. All traces of the old line have long ago disappeared.

The reconstructed branch left the main line at Broughty Junction (*see* Map on page 214), and from the opposite direction to the old line,

A PORTION OF THE ORIGINAL LINE NEAR ARBROATH.

with the points facing Arbroath, thus necessitating a "reverse" for trains coming from Dundee to the Pier. However, this presented no particular difficulty in those "free and easy" days of railway working, as the trains on reaching the Junction were "backed" along the branch, the same method being adopted on the return journey. And this for a distance of fully half a mile!

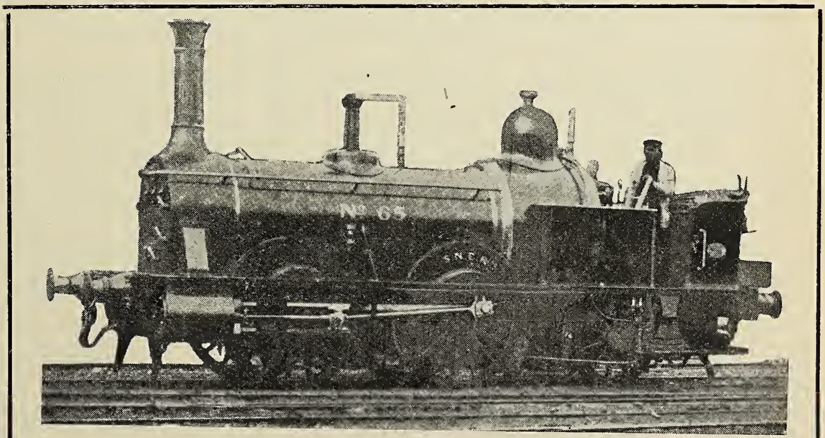
It is a fact worth mentioning that prior to the opening of the Pier Branch, passengers for Edinburgh were conveyed from the Craig Pier at Dundee to Tayport in steamers, which called at Broughty Ferry on the way.

The locomotive repairing shops of the Dundee and Arbroath Railway were situated at Broughty Ferry, close to the station. When the line became the property of the Scottish North Eastern Railway these shops were, of course, no longer required, as necessary repairs were then carried out at the Scottish North Eastern Company's own works at Arbroath. However, the building still exists, and is used at the present day by the joint railway company as a workshop in connection with the permanent way and signalling departments of the line.

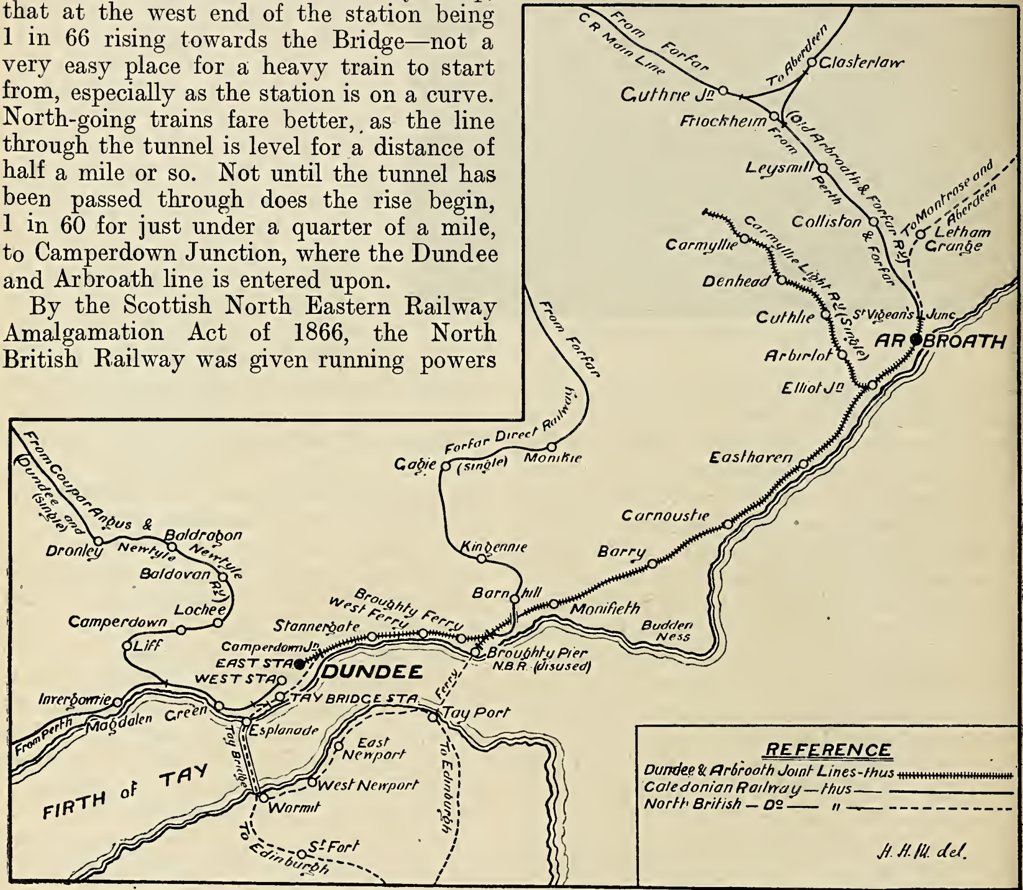
Before taking leave of the period of this Railway's existence as a separate company, it is interesting to record that in those days the practice of "slipping" carriages was to some extent indulged in.

With the opening of the ill-fated Tay Bridge, in the year 1878, a new era began for the Dundee and Arbroath Railway, for from that time it became a part of the North British Railway's route to the North. The engineering works which were rendered necessary in connection with this undertaking included, in addition to a new line in Fife from Leuchars to the Tay Bridge, a line from the north end of the Bridge to connect the North British Railway with the Dundee and Arbroath line, and a station at Dundee which is situated about midway between the bridge and the junction with the Dundee and Arbroath Railway. A considerable amount of excavation was necessary in accomplishing this latter work, as the station platform (which is an "island" with "platform" and "through" roads "up" and "down") is actually below sea level, and for half a mile between this and the junction, the line is carried beneath the town, close to the docks, and immediately underneath the Harbour Railway, already referred to. This tunnel was constructed on the "cut and cover" principle.

Owing to the low level of this portion of the line, and the close proximity of the



NO. 65 OF THE SCOTTISH NORTH EASTERN RAILWAY, ONE OF THE 0-4-2 T LOCOMOTIVES THAT FORMERLY WORKED ON THE DUNDEE AND ARBROATH RAILWAY.



MAP OF THE DUNDEE AND ARBROATH JOINT RAILWAY, AND CONNECTING LINES OF THE CALEDONIAN AND NORTH BRITISH RAILWAYS.

river, the possibility of flooding has to be considered, and to obviate such a calamity pumps are kept at work night and day.

It is only to be expected that the gradients at either end of this line are fairly steep, that at the west end of the station being 1 in 66 rising towards the Bridge—not a very easy place for a heavy train to start from, especially as the station is on a curve. North-going trains fare better, as the line through the tunnel is level for a distance of half a mile or so. Not until the tunnel has been passed through does the rise begin, 1 in 60 for just under a quarter of a mile, to Camperdown Junction, where the Dundee and Arbroath line is entered upon.

By the Scottish North Eastern Railway Amalgamation Act of 1866, the North British Railway was given running powers over all the Caledonian Railway's lines North of Larbert. As the North British (Dundee and Arbroath Joint Line) Act of 1879 did not come into force until February 1st, 1880, it came about that, although the Dundee and Arbroath line was still Caledonian territory, the North British Railway exercised its running powers over this section on the opening of the Tay Bridge, and until the joint line became an accomplished fact. Two through trains were run daily in each direction between Edinburgh (or rather Burntisland) and Aberdeen, worked by the North British Railway's own locomotives, other through coaches being attached to the trains of the Caledonian Railway from Dundee East at the Junction, whence they were worked through to Aberdeen.

With the opening of the Tay Bridge, the Broughty Pier Branch was closed, it was then thought for ever, but after the terrible catastrophe of December 28th, 1879, it was re-opened, and remained in use until the present bridge was opened for traffic, on June 20th, 1887.* During this period passengers for Edinburgh were conveyed to Broughty Pier by trains which started from the North British (Tay Bridge) station at Dundee. These trains were worked by the North British Railway's locomotives to Broughty Junction, where a second engine was kept for the purpose of taking them on to the pier. When it is remembered that a

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* Although the New Tay Bridge was officially opened for traffic on June 13th, 1887, it was not actually used for ordinary through passenger trains until a week later.

"reverse" was necessary in order to reach the Pier Branch, this was the most expeditious arrangement. This branch engine was provided alternately by the Caledonian and North British Railways, each being responsible for a year at a time. It was usually a "4-wheeler," and was also used for shunting in the Broughty Ferry goods yard during such times of the day as it was not required on the branch.

Following the custom which obtained before the closing of the branch in 1878, the line, though double, was worked as a single line on the one-engine-in-steam system, the other road being used for storing carriages.

On Sundays the branch line engine was not brought out, so the North British engine which worked the trains from Dundee, used to go right through to the Pier, making it necessary for it to 'run round' the train at the Junction.

No goods traffic ran on the Pier Branch after its re-opening, as the goods boats were not again brought into service. All goods trains for the South were therefore sent over the Caledonian line *viâ* Perth.

After the fall of the Tay Bridge, and prior to the opening of the North British Railway from St. Vigean's Junction to Kinnaber Junction, the North British Railway ceased to run its own trains through to Aberdeen, but it ran one train a day from Dundee to Bridge of Dun (on the Caledonian main line), at which place the coaches were handed over to the Caledonian Railway, which took them on one of its own trains to Aberdeen. A South-going train which arrived shortly afterwards used to bring North British coaches for Dundee which were detached at Bridge of Dun, and worked to Dundee by the North British engine, which had arrived earlier with the North-bound coaches.

This train was invariably worked by one of Mr. D. Drummond's 5 ft. bogie tanks, No. 103, then named "Montrose," which had the distinction of being at that time the only bogie engine regularly employed on the joint line.

THE OLD STATION AT ARBROATH AT THE PRESENT TIME, SHOWING PART OF PLATFORM.

The line of flagstones at back of fence forms the edge of platform. The stairs on which the children are standing is a comparatively modern erection.

Upon the opening of the North British line from St. Vigean's Junction to Kinnaber Junction in 1883, the Dundee-Aberdeen service was increased to four trains daily in each direction, which were worked throughout by North British locomotives.

Through carriages were run on these trains from Aberdeen to Broughty Pier and *vice versâ*, a stop being made at the Junction to detach or attach the coaches.

With this increased service the bogie tank gave place to larger engines, of which two were stationed at Dundee, and two at Aberdeen.

On Sunday, June 19th, 1887, the last train ran over the Pier branch, and it was finally closed. The old platform at the Pier station still remains, though the station buildings were demolished about six years ago. The rails have never been taken up, and though in places covered with earth and grown over with weeds, they are still in evidence.

This, however, only refers to the actual station, as the greater part of the branch is used as carriage sidings. The station, being actually on the pier from which the steamers sail for Tayport, is quite open to the public, so the rest of the branch has been entirely cut off by a stout fence of sleepers.

It is now time to turn our attention to a few of the principal features of the joint railway. The present terminus of the line, Dundee East station, was built by Act of 1852.

It is situated a few yards to the east of the old Trades Lane station of the Dundee and Arbroath Railway. It consists of two main platforms, with a bay on each side, making four available platform roads, which are used indiscriminately for arrival or departure as circumstances demand.

As the line was of necessity slightly diverted to the north on the building of the present station, the old main line to the Trades Lane station lies to the south of the present terminus, and is used for storing carriages, and as one of the means of access to the harbour lines. The old station has entirely disappeared, but there are still signs which tell those who pass along Dock Street, on their way to the East station, of the existence of a former station in what is now a very busy thoroughfare. The Joint Goods station and yard are situated on the north side of the passenger station.

THE OLD STATION BUILDINGS AT CARNOUSTIE, NOW USED AS THE STATIONMASTER'S HOUSE.

The present station is situated to the right hand of the picture, beyond the level crossing.

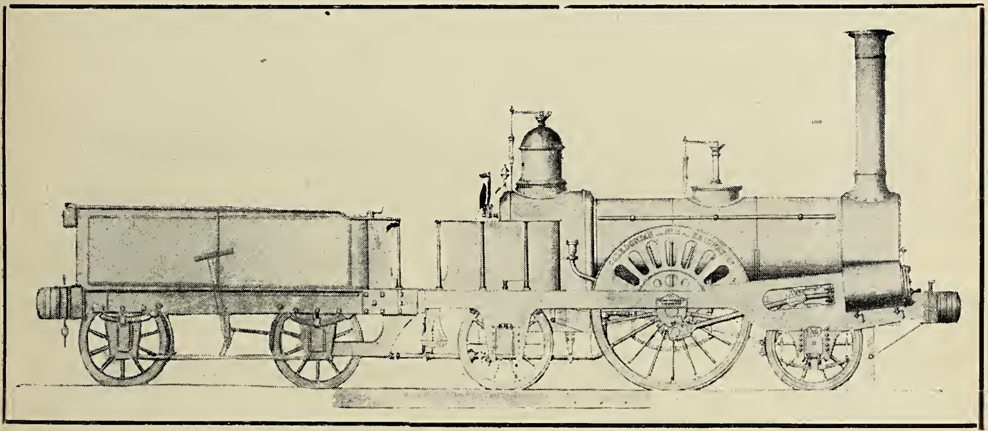
The passenger traffic at Dundee East is entirely local, and, with the exception of a few Caledonian trains which run to and from Forfar *viâ* the Forfar direct line, about half a dozen locals to Barnhill and back on the same branch, and one daily train to Guthrie, it is entirely joint. Until quite lately the Caledonian Railway ran a service of express trains to Montrose *viâ* Arbroath and Dubton, but in consequence of the recent working agreement with the North British Railway, these trains have been entirely withdrawn.

At a distance of 21 chains from the terminus, is Camperdown Junction, after passing which, the line runs alongside of the harbour. Over this section, which, as stated above, formerly belonged to the harbour trustees, until within comparatively recent years, the speed limit imposed by that body was four miles an hour! This restriction was apparently seldom absolutely adhered to, and was finally abolished at about the time of the opening of the Forth Bridge.

The first station on the line, and the most modern, is Stannergate, two miles from Dundee. It was opened in the year 1901. Here there are up and down platforms with four roads, two for through traffic, and two for stopping trains, as well as a goods yard of considerable size, carriage sidings, and a goods loop line. It is worth mentioning that this station stands a short distance to the west of the site of the Craigie station of 1838.

The line now runs close to the shore, as indeed it does for a considerable part of its entire distance, and another mile brings us to West Ferry, a small station used for passenger traffic only. Here the tickets of all " up " stopping trains are collected or examined, both Dundee East and Dundee Tay Bridge being " open " stations.

Broughty Ferry, half a mile beyond this, is a fairly important station at which several of the principal London trains stop " when required," to set down for the Joint line, a privilege of which advantage is very frequently taken. It is interesting to record that in 1838 the first engines of the Dundee and Arbroath Railway were brought from Dundee by road, and were here placed on the line at a level crossing which formerly existed at the west end of the station. This level crossing has been superseded by a bridge, but one at the east end of the station is still in existence. At the 4-mile post from Dundee, Broughty Junction is situated, and here the Forfar direct line branches off to the right, and after a considerable gradient, crosses the joint line by an overhead "skew" bridge. As the Forfar line is entirely Caledonian, it does not come within the scope of the present article, and it is sufficient to say that it was opened between 30 and 40 years ago, before which time passengers for Forfar had to travel *viâ* Arbroath and Guthrie. Leaving Broughty Junction the joint line passes through Monifieth to Barry, 8¾ miles from Dundee. Shortly before reaching Barry, the camp station, Buddon—formerly called Barry Review Platform—is passed. This station is only used when required for military purposes, so does not appear in Bradshaw.



SINGLE ENGINE WITH OUTSIDE CYLINDERS.

(*Reproduced from an old print.*)

One of two engines, which formerly belonged to the Caledonian Railway, but which were in the possession of the Dundee and Arbroath Railway at the time of that Company's amalgamation with the Scottish North Eastern Railway in 1862. Built in 1847. It will be noticed that the number on the splasher is that by which the engine was known before passing out of the hands of the Caledonian Railway. The Dundee and Arbroath Railway's numbers for these two engines were '3' and '4.'

Barry station was opened in the year 1851, and with reference to this the writer has recently been shown a letter, dated July 31st, 1851, from the office of the manager of the Dundee and Arbroath Railway to a guard, advising him that Barry station was now open, and that he (the guard), was to issue tickets to intending passengers, there being at that time no stationmaster, and no station staff! Now Barry is a flourishing military centre, and the ministrations of the guard would scarcely be sufficient to cope with the needs of the present day.

The old time table, a photograph of which is shown on page 211, mentions that the trains will stop at Deyhouse. This Deyhouse crossing still exists, and is situated at the west end of the present Barry station.

In addition to being an important military station, Barry also possesses a most excellent golf course, as does also Monifieth, and Carnoustie, the next station on the line is a name which is almost inseparably connected with the "Royal and Ancient Game." Attention may be called to the fact that from Monifieth to Carnoustie, a distance of 4¾ miles, the line is absolutely straight. After leaving the latter place, however, the railway takes a slightly more northerly direction following the coast line, and passing a small wayside station named East Haven, soon reaches Elliot Junction, where there is a neat modern station with an "island" platform.

The Carmyllie Branch, which here leaves the main line, now calls for a few remarks.

This railway possesses the distinction of being the first line in Scotland opened for passenger traffic under the Light Railways Act of 1896.

It was opened in 1854 as a private railway to convey freestone from the Carmyllie quarries to the Dundee and Arbroath Railway, and was worked by that company until the amalgamation with the Scottish North Eastern Railway in 1862, to which it was transferred, together with the Dundee and Arbroath line. From time to time, many endeavours were made to induce the joint railways to run a passenger service over this section, but the expense of installing signalling and other appliances was not warranted by the traffic which was likely to result. However, when the Light Railways Act became law, an order of the Light Railway Commissioners was granted, constituting the "Carmyllie Light Railway," and some necessary alterations having been completed, the line was opened for passenger traffic on February 1st, 1900.

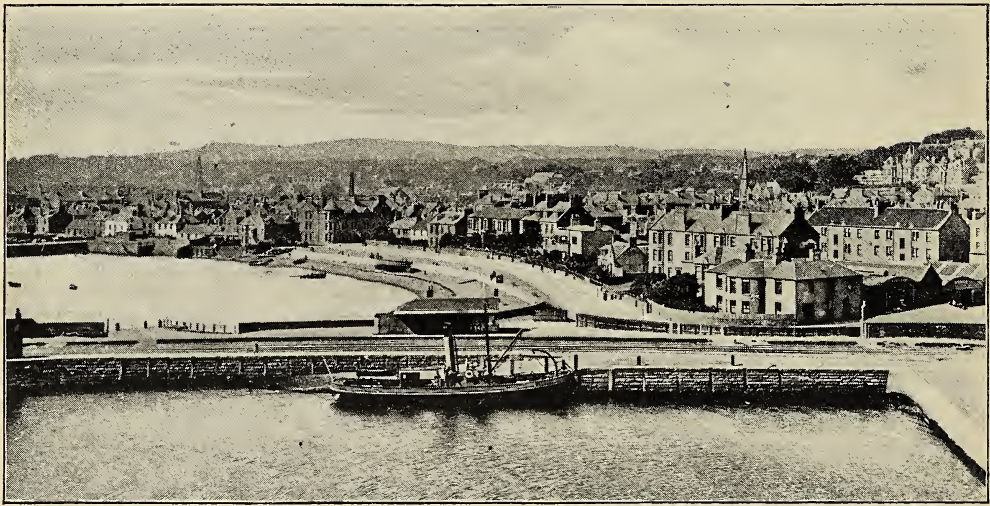
The gradients are severe, the steepest being 1 in 37, so that the trains are necessarily restricted as to length in order to keep the loads as light as possible. Only third-class accommodation is provided, and the trains, which are "mixed," usually start from Arbroath. As the Junction with the main line at Elliot is made by means of trailing points on to the "down" road it is necessary to shunt Carmyllie-bound trains over the cross-over in order that they may reach the branch.

The line is five miles in length and there are three intermediate stopping-places, Arbirlot, Cuthlie, and Denhead, tickets from which are issued by the guard of the train.

The main line, after passing through Elliot, leaves the track of the original railway, a glimpse of which can be seen on the right hand side of the line, and, entering a cutting, locally known as the "Gullet," reaches Arbroath, 1½ miles from Elliot.

Arbroath station, being of a very antiquated type, is quite inadequate for the needs of present-day traffic, and as there seems to be some probability of a new one being built before long, a description may well be deferred until this is an accomplished fact. About half a mile further north is St. Vigean's Junction, the end of the joint line, about 17 miles from Dundee. Here there is a modern engine shed, built some years ago to replace an older structure.

The gradients on the joint line are very easy, the only ones of any importance being 1 in 97 for about 605 yards, rising from Elliot Junction towards the entrance to the "Gullet," whence the line falls towards Arbroath for 341 yards at 1 in 127 and for 314 yards at 1 in 165.



THE PIER STATION AT BROUGHTY FERRY.

(Now disused.

Behind the steamer in the foreground is seen the sloping quay along which the goods trucks were run on board the train ferry boats. Immediately behind the sloping quay are the old station buildings, now taken down.

The joint line possesses no stock of its own, the two owning companies providing locomotive and carriage plant for working the traffic. Each company provides for the running of so many trains per week, and those trains which are run by the Caledonian during one week are run by the North British during the next, and *vice versâ*, so that the daily work is always as nearly as possible equally divided between the two. This, however, appears to apply mainly to engines and guards, as many trains are to be seen running at the present time which consist of a judicious mixture of stock belonging to both railways, and an engine of one company may often be seen hauling a train of coaches belonging to its partner.

On Sundays the traffic—which is limited to three trains from Dundee to Broughty Ferry and back, and one to Arbroath and back, calling only at Broughty Ferry and West Ferry in each direction—is worked by the Caledonian one week, and by the North British the next, one engine being quite sufficient for Sunday duty.

When it is known that there are daily between twenty and thirty local trains in each direction—not, of course, all traversing the entire length of the line, several starting from Dundee and terminating either at Broughty Ferry, Monifieth or Carnoustie and then returning to Dundee—some twelve Caledonian trains in each direction, eleven of which run to or from the Forfar direct line, and one to Guthrie and back, an extra Caledonian Forfar express twice a week "up" and "down," and nine express trains and one slow in each direction from the North British line, some of which in the summer months are often run in duplicate, it will be understood that the passenger traffic on the joint line is by no means light. The North British Railway expresses, both those having through coaches to and from England and those which are entirely Scotch, are all, as a rule, worked by Mr. W. P. Reid's new "Atlantic" locomotives, six of which work from Aberdeen and four from Edinburgh.

On Sundays the North British Railway traffic consists of one North-going train in the morning (a continuation of the 11.30 p.m. *ex* King's Cross) and a corresponding South-going one in the afternoon.

With regard to goods traffic, each company works its own, so that there are no "joint" goods trains. Following the usual Scotch custom, no goods traffic is dealt with on Sundays.

The North British Railway provides a goods pilot engine for shunting in the Dundee East yard, and the Caledonian Railway is responsible for that at Arbroath.

The Carmyllie line is worked turn about yearly by Caledonian and North British, each company providing plant for a year at a time.

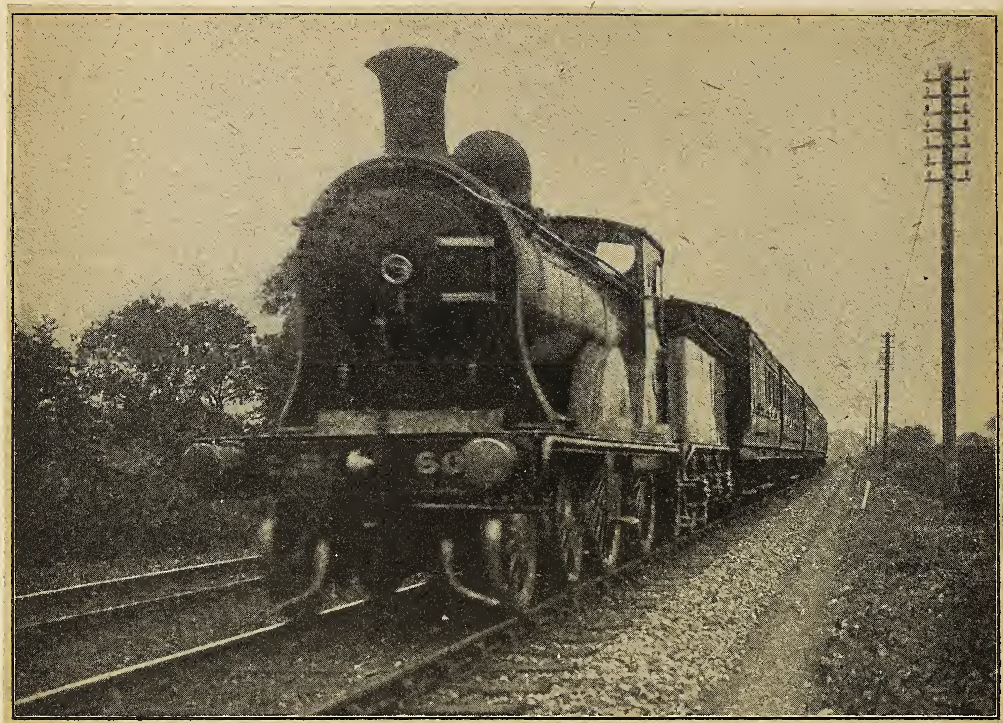
There is no engine shed at Dundee East, the engines of both companies gaining access to their own sheds at the west end of the town by means of the North British line.

It ought to be mentioned that there is a junction with the Caledonian Railway's Dundee and Perth line close to the Tay Bridge, over which a large amount of goods traffic is worked, and by means of which Caledonian engines are enabled to reach the sheds. A turn-table is provided at Dundee East, so that engines requiring to be turned do not have to run through to the sheds.

Such then is a brief summary of the history, and past and present working of the Dundee and Arbroath Joint Railway, which will show that, although it was not anticipated at the outset that it would be more than a local line, it has become part of a trunk line of no mean importance.

The writer's thanks are due to Mr. George G. Hamilton, the able manager of the joint railway, for the courteous manner in which he has readily given information on various points, and also to an old servant of the original Dundee and Arbroath Railway, whose natural modesty has compelled him to beg that his name may not be mentioned, but without whose aid many interesting facts concerning the early days of the line would never have been brought to light, as well as to other friends interested in the subject.

* * *



Photo] [*J. G. Irving.*

CALEDONIAN RAILWAY.
Down West Coast express near Kirkpatrick.
4-4-0 locomotive, No. 60.

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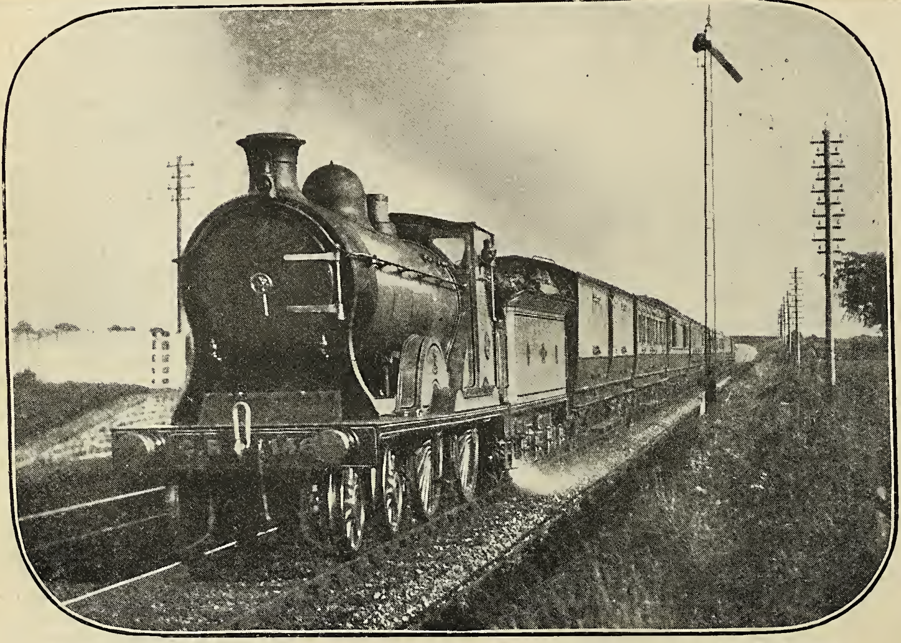


Photo] [*F. E. Mackay.*

CALEDONIAN RAILWAY.
Euston-Edinburgh Express passing Rockliffe. No. 146.

SOLWAY VIADUCT FROM SOUTH-WEST. [*D. S. Barrie.*

The Solway Junction Railway.

By G. J. ASTON and D. S. BARRIE.

CONSPICUOUS to the eye of the traveller by train along the former Glasgow & South Western (now L.M.S.) Railway's route between Carlisle and Glasgow is a great viaduct, which may be seen as the train approaches the border town of Annan, spanning the windswept Solway Firth in gaunt and melancholy isolation.

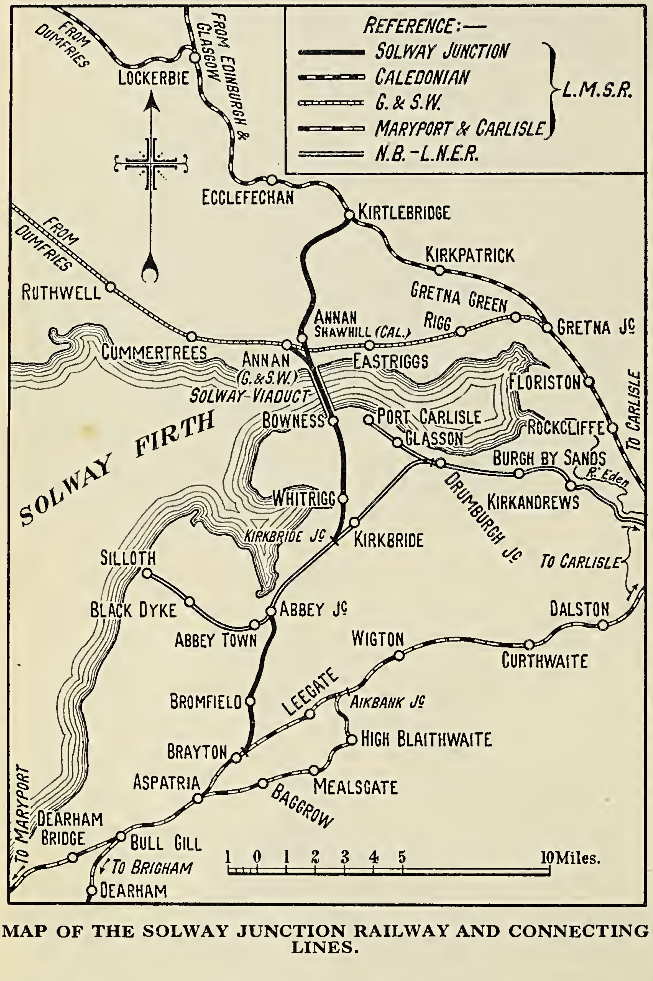
This, the Solway Viaduct of the former Solway Junction Railway, has not been used for railway traffic since 1921, but stands as a reminder to the railway student that there was for many years an over-water railway route between Scotland and England, and that the Solway Junction Railway, of which this viaduct formed an important unit and the chief engineering feature, was at one time a valuable railway route between Scotland and the industrial areas of North-West England.

Extending from a junction with the Caledonian Railway's main line at Kirtlebridge to junctions with the North British and Maryport & Carlisle Railways at Kirkbride and Brayton respectively, the Solway Junction Railway was, in fact, an important link between Southern Scotland and the industrial area of England, already referred to; its promotion was due to a demand for the provision of direct railway facilities for the transport of hematite ore from the mines of Cumberland to the blast furnaces of Lanarkshire, and when this branch of the industry fell into decay, towards the end of last century, through the increased importation of ore from Spain, the affairs of the Solway Junction Railway similarly declined, and to-day only 12 miles or so out of its route mileage of about 22 miles are worked, and these only for freight traffic.

Originally incorporated under Act of June 30, 1864, the Solway Junction Railway, in common with many other concerns, did not carry out the construction of all the railways which it proposed to build in the first place, various abandonments being made under a Deviation Act of June 29, 1865, which also authorised the Caledonian Company to use Brayton station and a small section of the Maryport & Carlisle Railway at that place; similar powers were given in respect of a short branch line from the Solway Junction at Annan to the G.S.W.R. station. A further Act of July 15, 1867, gave running powers over the North British Railway (Carlisle & Silloth Bay line) between Carlisle (Canal Junction) and Silloth. In practice the latter powers were normally confined to the section of the N.B.R. between Kirkbride and Abbey Junctions, which gave through communications between two otherwise isolated sections of the Solway Junction Railway. The three lines actually constructed were the main line, in two sections, from Kirtlebridge (C.R.) to Kirkbride (N.B.R.) and from Abbey Junction (N.B.R.) to Brayton (M. & C.R.) with a short spur to the G.S.W.R. at Annan.

These three sections, the last-named being little more than a shunting spur, were opened as single lines in September, 1869, for goods, and in July, 1870, for passenger traffic, with passing loops for passenger trains at Bowness, Kirkbride and Abbey, and for goods trains at Annan.

The subsequent history of the Solway Junction Railway may here be summarised down to the formation of the London Midland & Scottish Railway in 1923. By an Act of July 21, 1873, the Caledonian Railway was vested with the ownership of the Solway Junction line between Kirtlebridge and Annan (Shawhill), and under the Solway Junction Railway (Transfer) Act of July 6, 1895, the whole undertaking was transferred to the Caledonian in consideration of a perpetual annuity of £4,500, while the North British Railway were granted running powers over the line from Abbey Junction to Brayton. Provision was also made for the Caledonian to work passenger trains into the G.S.W.R. station at Annan. Despite the transfer to the Caledonian under this latter Act, the Solway Junction Railway nominally maintained its separate existence until the formation of the L.M.S. in 1923.



MAP OF THE SOLWAY JUNCTION RAILWAY AND CONNECTING LINES.

At Kirtlebridge, the northern starting-point of the line, there is a junction with the Caledonian Railway facing towards Glasgow, and in the days when a passenger service was worked, the Solway trains used the outer face of the down island platform. There are also freight sidings at Kirtlebridge, and a small engine-shed which is not now used. Leaving Kirtlebridge, the single line of the Solway Junction route bears rapidly away to the south on gradients of considerable severity.

Some distance before Annan is reached the line traverses a deep cutting, where is located a large stone quarry whose traffic is provided with a loading bank alongside the line. Annan (Shawhill) is the designation of the Solway Junction station at that town, reached after a run of five and a-half miles from Kirtlebridge. The station, which adjoins the main Carlisle road on the outskirts of the town, is a single-platform structure, but the width of the alignment at this point, together with the peculiar design of the road overbridge (which was evidently intended to form a footbridge for railway passengers as well), suggests that provision was made for the erection of a second platform if necessary. The Annan passing loop is a little way to the south of the passenger station; there are fairly extensive goods sidings, as the freight business, mostly of a seasonal character, often attains to considerable dimensions.

Leaving Annan station, a deep cutting is traversed, beyond which the line crosses over the main line of the former Glasgow & South Western Railway by an iron girder bridge. Immediately beyond this bridge is the junction, controlled at the east end by a ground frame, for the spur line (32 chains in length) which ends in a double-road junction with the main line of the G.S.W. section. At its west end this spur line is controlled by Solway Junction Box, Annan station being a quarter-of-a-mile farther on.

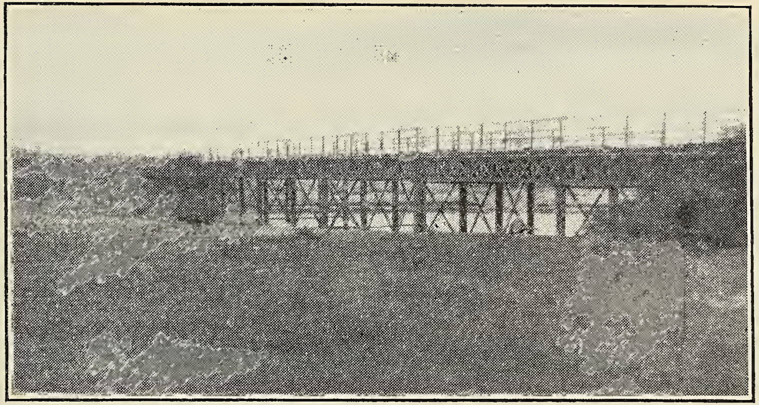
This connecting line is of considerable importance for the interchange of local goods and cattle traffic between the Caledonian and G.S.W. sections of the L.M.S., and one or more double trips to and from Annan (Shawhill) are worked over it daily into the G.S.W. station.

Resuming the journey over the main line of the Solway Junction route, from the point of junction with the Annan spur line the railway is on a fairly steep embankment, which descends at a gradient of about 1 in 80 to the Solway Viaduct. Here the railway reaches the shores of the Solway Firth, and the scenery though pleasant in summer is in winter-time bleak, barren and windswept in the extreme.

Second only in length to the Forth Bridge, the Solway Viaduct, despite its dilapidated appearance, is even to-day an impressive structure. It is 1,940 yards in length, built of cast iron, and consists of 181 single piers and 12 double piers, a short section at the Scottish end having been built wider than the remainder, while the foundations throughout were made to carry a double-line structure if required. At low tide rail level is about 35 feet above the water; the channel is a shifting one, and the ebb tide attains a velocity as great as ten miles an hour. The single piers of the viaduct were constructed each of five cast-iron columns, the latter standing on cast-iron piles driven to a depth of from 18 to 21 feet. Timber walings protect the tops of the piles, while piles of stones were placed round the piers to protect the foundations from the scouring of the tides.

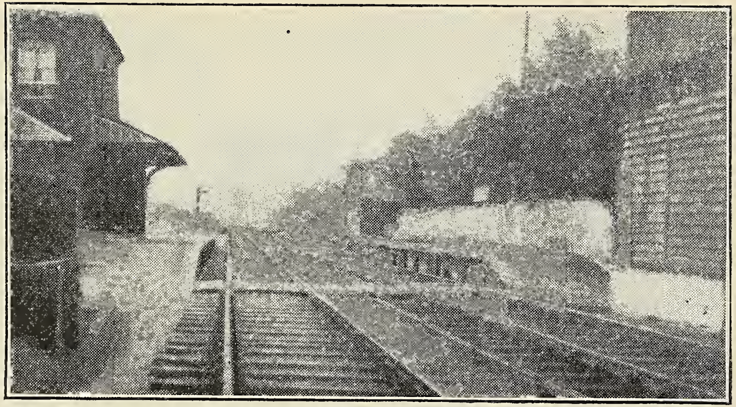
The accompanying illustrations convey a good impression of the construction of this interesting viaduct, which, despite its sturdy construction, suffered on several occasions through the fearful weather conditions prevailing in such an exposed position during severe winters. In the winter of 1875-6 several of the columns forming some of the piers were damaged through freezing of water which had found its way inside the columns, while during the great frost of January, 1881, even more serious damage was done. As soon as the ice thawed the bridge was bombarded with floes racing down the Firth from the rivers above, the violence and persistence of the concussions being so great that a number of piers gave way. This left the girders suspended, and, finally, 45 piers and 37 girders collapsed; one ice floe, which crashed into the bridge, was found to be 27 yards square and 6 feet thick!

In the following year authority was obtained from Parliament for the raising of £30,000, which was devoted to repairing and strengthening the viaduct. The line was not reopened throughout until May 1, 1884. Services were suspended during the war as between Annan and Brayton, but were resumed in 1920, when until 1921 passenger services were maintained between Kirtlebridge and Brayton, there being usually three trains each way on weekdays, and the throughout journey of 21¼ miles taking about an hour by the fastest service. As from September 1, 1921, both the passenger and goods services south of Annan were withdrawn owing to the viaduct being no longer considered safe for traffic. In May, 1922, the southern section of the line from Brayton to Abbey Junction was reopened for freight traffic. Passenger services between Kirtlebridge and Annan (Shawhill) were maintained until April 25, 1931, when they were withdrawn and a road transport service was substituted. Latterly this shuttle service between Kirtlebridge and Annan was supplied by one passenger coach, some of the trains being mixed; the journey time was about 10 minutes, and there appeared to be no severe restrictions on the type of engine permitted, as the writers have seen various types, ranging from a small Caledonian 4-4-0 tank to a large inside-cylinder mixed traffic 4-6-0. At the present time the train services over the Solway Junction section consist solely of the goods



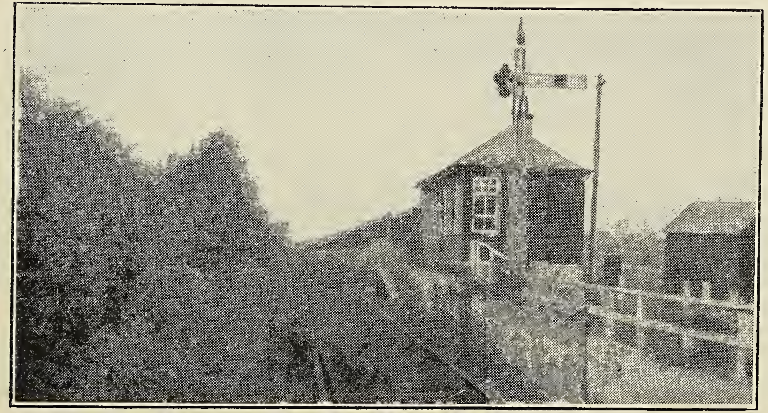
[G. J. Aston.

BRIDGE OVER RIVER WAMPOOL.



[J. J. Cunningham.

BOWNESS STATION.



[G. J. Aston.

WHITRIGG STATION.

[G. J. Aston.

KIRKBRIDE JUNCTION, LOOKING SOUTH.

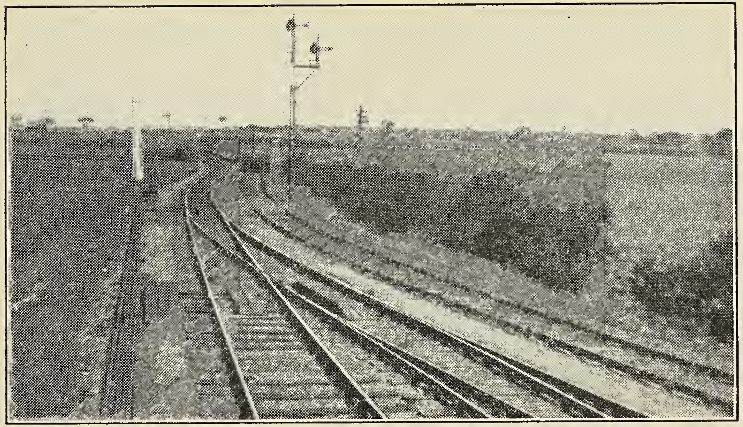
trains between Brayton and Abbey and Kirtlebridge and Annan respectively, the latter also working the trips to and from Annan G.S.W.

Before passing on to the southern section of the railway, it may be mentioned that subsequent to the closing of the railway south of Annan the viaduct formed a convenient, but totally illegal, footpath for the good citizens of Scotland to gain access on the Sabbath to Bowness; the latter village being in England, offered the attraction of licensed hospitality denied to Scotsmen on Sundays in their own country! To stop this practice a barbed-wire barricade was erected at the northern end of the viaduct, but this cannot be said to have proved a successful barrier to the enterprising Celt. This practice has largely ceased, however, since the inauguration of a Sunday bus service between Annan and Carlisle. Though lacking the outstanding engineering features of the section between Kirtlebridge and Bowness, the southern part of the Solway Junction Railway is by no means devoid of interest. It has the air of romance which is the peculiar perquisite of any Scottish railway on English soil; this distinction, however, it must share with the Caledonian main line south of Gretna, the N.B. Waverley route south of Kershopefoot and the Silloth and Border Counties branches. But this section of the Solway line is unique in being the only Scottish railway in England completely isolated from its parent system, though in fairness it must be conceded that access to it is by means of a rival Anglo-Scottish line.

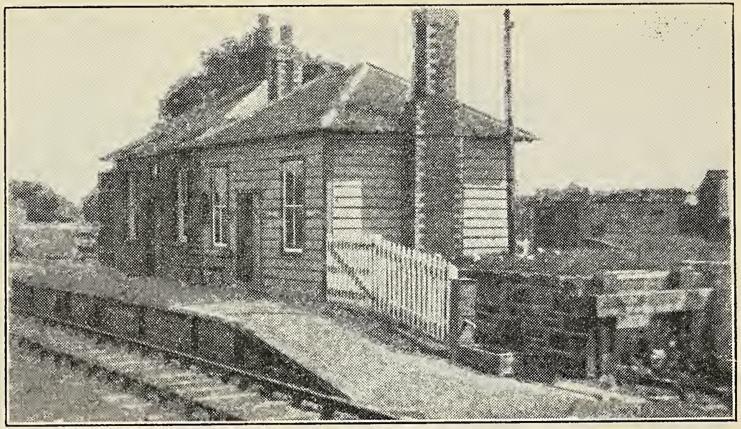
The line between Brayton and Bowness, which is single throughout, falls into three simple divisions, separated by the passing places at Kirkbride Junction and Abbey Junction. Throughout, the line passes through rather flat agricultural country, very prone to flooding in wet weather, and several streams of fair width are crossed, notably the River Wampool between Whitrigg and Kirkbride, across which the line is carried by an iron bridge of much the same construction as the neighbouring Viaduct. Coming south from Bowness, which is a crossing place with sidings and two platforms, the line rises rapidly as it leaves the water's edge, passing through pleasant enough country. Here the ravages of time can be seen in the tangled undergrowth which covers the rails in many places, especially at a point about 1¼ miles from Bowness where the line runs through a small wood. Whitrigg station is reached in just under 3 miles. This is a single-line station, with a solitary siding behind the platform and covered waiting room. Immediately south of the station is a level crossing, protected by signals controlled by a ground-frame on the platform. Leaving Whitrigg we pass on to a sandy soil somewhat reminiscent of the Ainsdale-Southport section of the Cheshire Lines, and half a mile on cross the Wampool by the bridge referred to previously. Approaching Kirkbride there is a passing loop, which, however, becomes single again before forming the junction with the N.B. Silloth line. The box here, of N.B. pattern, has been closed since the abandonment of the Solway Junction line, and the N.B. staff section is now from Drumburgh to Abbey Junction, a distance of over 7 miles. The junction points have also been taken out, and it would appear to be only a matter of time before the Kirkbride-Bowness section is lifted.

Passing over the intervening stretch of L.N.E.R. to the detached southern section, we find a few yards north of Abbey Junction an iron bridge which replaced a wooden erection several years ago. In the usual manner the new bridge was built up alongside the old one and the rails slewed over into the new position. On the demolition of the old structure, however, the new one was not moved into its place, and the resulting " bulge " in the track can be seen in the accompanying photograph taken from Abbey Junction box.

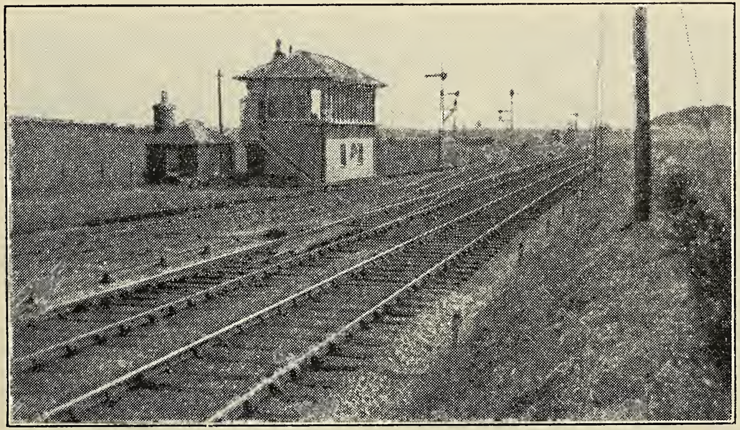
At Abbey Junction both companies maintained stations for interchange purposes. That of the Solway Junction still exists as a staff office; the N.B. station was removed in 1922, when the Solway passenger service had been withdrawn, its sole usefulness being thereby taken away, as the station at Abbey Town (half-mile further on) is more convenient for the village. Abbey Junction box, commodious and lofty, controls all movements on both lines, and is owned and staffed by the L.N.E.R. The first line to diverge is a crossover to a Solway



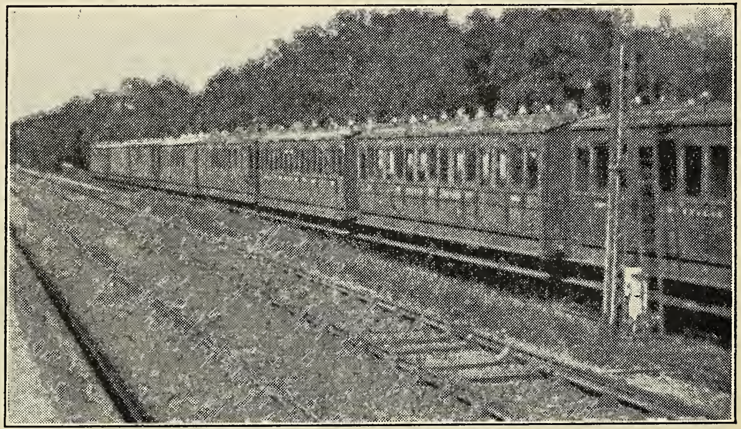
ABBEY JUNCTION, LOOKING NORTH.



BROMFIELD STATION.



BRAYTON JUNCTION: SOLWAY LINE TO LEFT, MARYPORT AND CARLISLE LINE TO RIGHT.



M.S.J. & A. Jt. RAILWAY COACHES IN BRAYTON SIDINGS.

(*Photographs by G. J. Aston.*)

Junction dead-end siding, followed by a N.B. crossing loop (formerly dignified with a platform on each side), from the down line of which the Solway Junction platform line parts company in a few feet. The Solway Junction thus has a platform line and a loop, which, with an extra dead-end siding, is ample accommodation for the traffic offering. Not infrequently, too, the Solway line forms a convenient refuge siding for a N.B. Silloth-bound goods which has to be overtaken by a passenger train.

Leaving Abbey Junction we are again on the metals of the Solway Junction proper, but here is a different state of maintenance from that obtaining farther north, as befits a line which boasts at least one train a day, albeit with a throughout speed restriction of 25 m.p.h. The solitary wayside station of Bromfield has a single platform, with small goods yard, and its traffic is agricultural. Beyond this station the line rises sharply for the final 1¼ miles to the higher ground on which stands Brayton, the last outpost of Caledonian civilisation in the " land of the Sassenach." The connections at this point have been considerably modified in latter years, and there is now only a facing junction with the eastbound Maryport line, assisted by suitable crossovers.

On the north of the station are the comparatively extensive Solway sidings, which to-day present a rather pathetic sight, being almost filled, on the occasion of the writers' last visit, with old 6-wheelers from the then recently electrified Manchester, South Junction & Altrincham Railway. And yet in these same sidings which now accommodate the cast-offs of South Manchester, T.M. the King and Queen passed the night one time in 1916, as the illuminated certificate in the booking office still informs us.

On the other side of the station is a through goods loop in which such shunting as need be can be carried out, and here we reach the end of the Solway Junction Railway—some 15 miles inside the Border. Until recently the daily goods train, originally restored in 1922 as a thrice-weekly trip, worked through from Maryport to Abbey Junction and back, but this winter the service of the Solway line has been combined with that of the Mealsgate (M. & C.) branch—closed for passenger traffic in September, 1930—and the one train clears traffic for both branches.

And yet the Solway Junction still sees an occasional passenger train. The popularity of Silloth as a seaside resort for the Border folk is obvious on glancing at the summer services of the L.N.E.R., which provide not only a frequent service from Carlisle, but also through facilities from Newcastle. Silloth is not infrequently chosen as the venue for special parties, Sunday school treats, etc., from the Cumberland industrial area, and through workings from Maryport or beyond are fairly common in the summer months. These special trains call at Brayton Junction for tablet purposes and run forward to Abbey Junction, whence the L.N.E.R. works them into Silloth, reversal being, of course, necessary at Abbey. The L.M.S. engines generally return light to Maryport shed, proceeding again to Abbey in the evening to take over the return train.

Under modern operating conditions, therefore, the Brayton-Abbey Junction section of the Solway line has become little more than a minor branch of the M. & C., and that Scottish individuality which once characterised it has ceased to be noticeable in days when its traffic is worked only by ex-L.N.W. locomotives. And yet to any railway enthusiast with an eye for the glories of the past Brayton must ever share with Carlisle, Hexham and Berwick that distinctive interest which attaches to the Border interchange stations.

It remains but to speculate on the might-have-been. By an Act of August 10, 1882, the Solway Junction obtained powers to construct a new line from Bowness to the N.B. terminus at Port Carlisle, with additional running powers from Kirkbride Junction into Carlisle. Presumably the remaining section from Port Carlisle to Drumburgh Junction would have been similarly provided for had the authorised line ever been made, and we might have seen the Caledonian competing with the G. & S.W. for the Annan-Carlisle traffic over a line laid almost entirely in England! As it was, " competition " of a sort existed to the last, the fare from Carlisle to Annan *via* Kirtlebridge being identical with that *via* Rigg up to the closing of the line for passenger traffic in April, 1931.

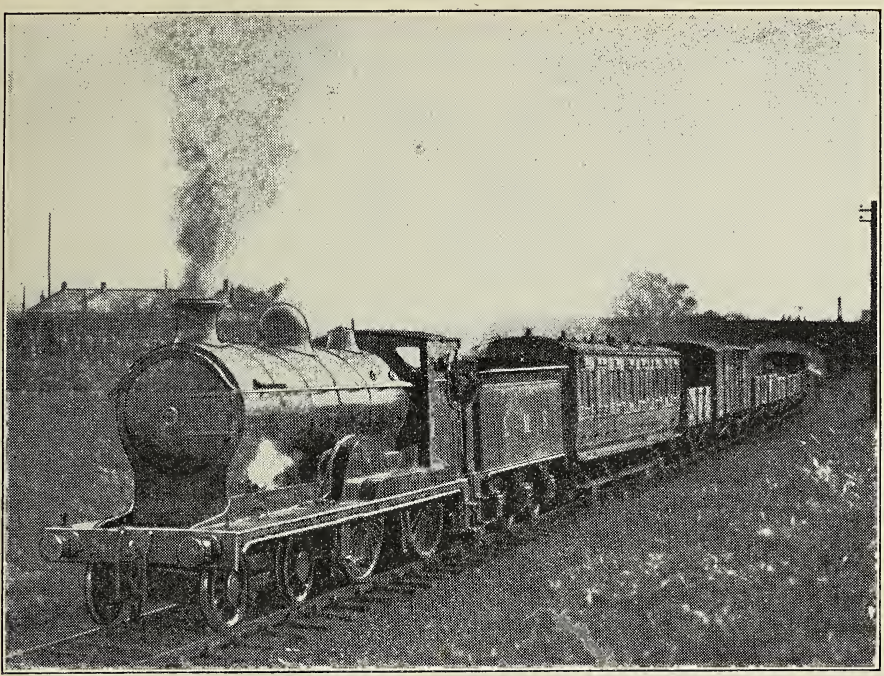
The point-to-point distances of the Solway line may conveniently be quoted, the total length of line open for traffic in 1920 being 21¾ miles, including running powers over the N.B. for 3¾ miles. The details are as follow:—

	m.	ch.
Brayton	0	0
Brayton Jc.	0	15
Bromfield	2	8
Abbey Jc.	5	22
Kirkbride Jc.	9	5
Whitrigg	10	15
Bowness-on-Solway ..	13	8
Shawhill Jc.	15	19
G.S.W. Jc. ..	15	51
G.S.W. Stn.	15	76
Annan (Shawhill).. ..	15	63
Kirtlebridge	21	18

Although from quite early years the Solway Junction Railway was "fathered" by the Caledonian, which worked the traffic for the greater part of the smaller company's existence, it is believed that when the railway was first opened the Solway Junction owned a few locomotives which subsequently were transferred to the Caledonian's stock. If any locomotive authority has information on this point it would be of great interest.

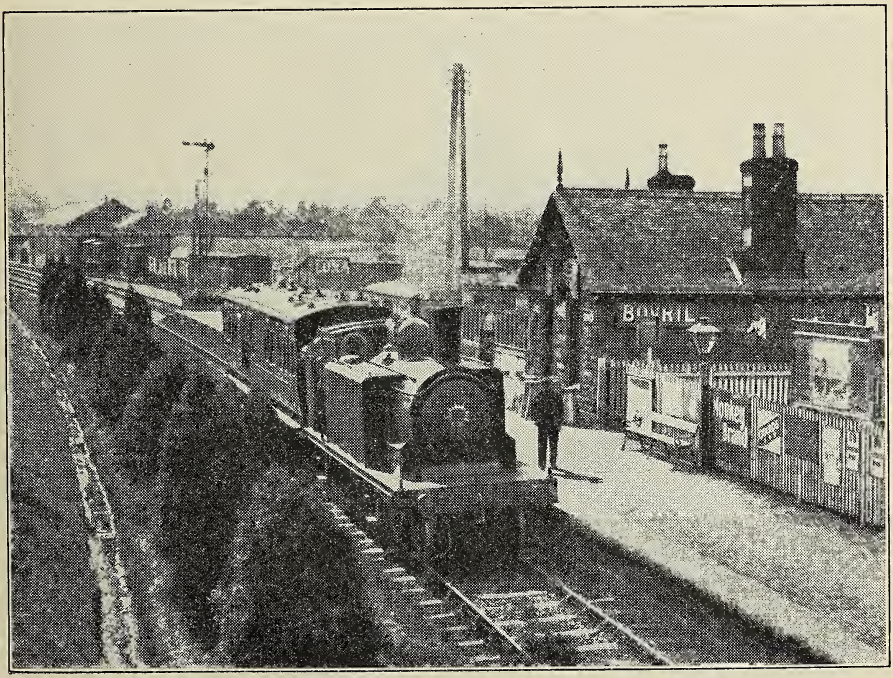
In conclusion the authors desire to express their appreciation of the permission given by Mr. T. H. Moffat, Managerial Representative for Scotland, L.M.S. Railway, to publish historical and technical information which he kindly supplied, and without which the article would have been incomplete, and to acknowledge the kind assistance of Mr. J. J. Cunningham, of Annan, in supplying certain of the illustrations.

THE CLYDE RESORTS BOAT EXPRESS, CALEDONIAN RAILWAY.



[J. J. Cunningham.

MIXED TRAIN LEAVING ANNAN (SHAWHILL) ON LAST DAY OF PASSENGER SERVICE.
L.M.S.R. Caledonian 4-4-0 No. 14463.



[J. J. Cunningham.

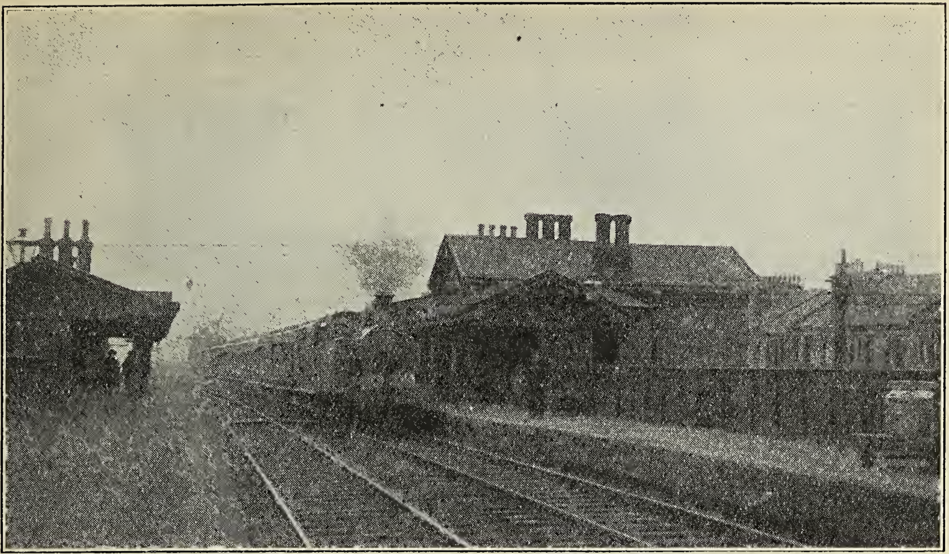
KIRTLEBRIDGE TRAIN AT ANNAN (SHAWHILL).
L.M.S.R. Caledonian 4-4-0 No. 15027.

SCENES ON THE SOLWAY JUNCTION RAILWAY.

whinnie, rising to 32 on the easier grades at mile-post 55, and falling to 26½ at the summit. From there the unusual time of 19 min. 42 sec. was made for the 17·8 miles to Blair Atholl, with an average of 60 m.p.h. for 7 miles, Blair Atholl being reached in 61 min. 42 sec. from Kingussie. From Blair Atholl the time taken to Pitlochry was 11 min., and from there 6 min. 48 sec. to Ballinluig, 15 min. 34 sec. to Dunkeld, 23 min. 37 sec. to Murthly and 28 min. 20 sec. to Stanley, but a lengthy signal stop outside Perth made the total time 45 min. 50 sec. from Pitlochry, or about 39½ min. net.

It is difficult to give any high commendation of such performances as these; even allowing for the relative tractive capacity of the locomotives, and the greater length of the gradients in the Highland case, the locomotive work seems to me considerably inferior to that performed by the North British " Atlantics " over the lengthy 1 in 70 ascents of the Waverley route of the L.N.E.R. between Edinburgh and Carlisle, or by compounds and other types of 4-4-0 locomotives of the L.M.S. up the terrific banks of the Ayr and Stranraer route. But now, as I have come to an end of my available space, the locomotive exploits of the wild south-west, and certain other Scottish routes, must be held over until next month. Meantime my acknowledgments are due to Messrs. R. A. H. Weight, C. T. Rhys, W. A. Seymour, F. A. Hillier, K. A. G. Raybould, D. R. Webb, S. Peyton, J. Brander, H. J. Hales, A. H. Hastie, R. M. Clarke, H. Dixon Hewitt, F. S. Bond, W. T. Allen, J. E. L. Skelton, L. W. Slaughter, T. W. Dron, O. S. Nock, J. A. Whaley, E. A. Gurney-Smith, J. G. B. Anderson, R. E. C. and J. E. M. L. for correspondence of no small interest received during the past month, and to them and all other of my regular readers I should like to convey the compliments of the present festive season, and my best wishes for the coming year.

Photo] CALEDONIAN RAILWAY. [*Mr. Tom M. L. Neish.*
Dundee train leaving Lochearnhead Station; drawn by 0-6-0 Engine No. 573.



GLASGOW-BEITH TRAIN AT BARRHEAD (JOINT) STATION.

Glasgow & South Western Railway rolling-stock and 0-4-4 tank engine.

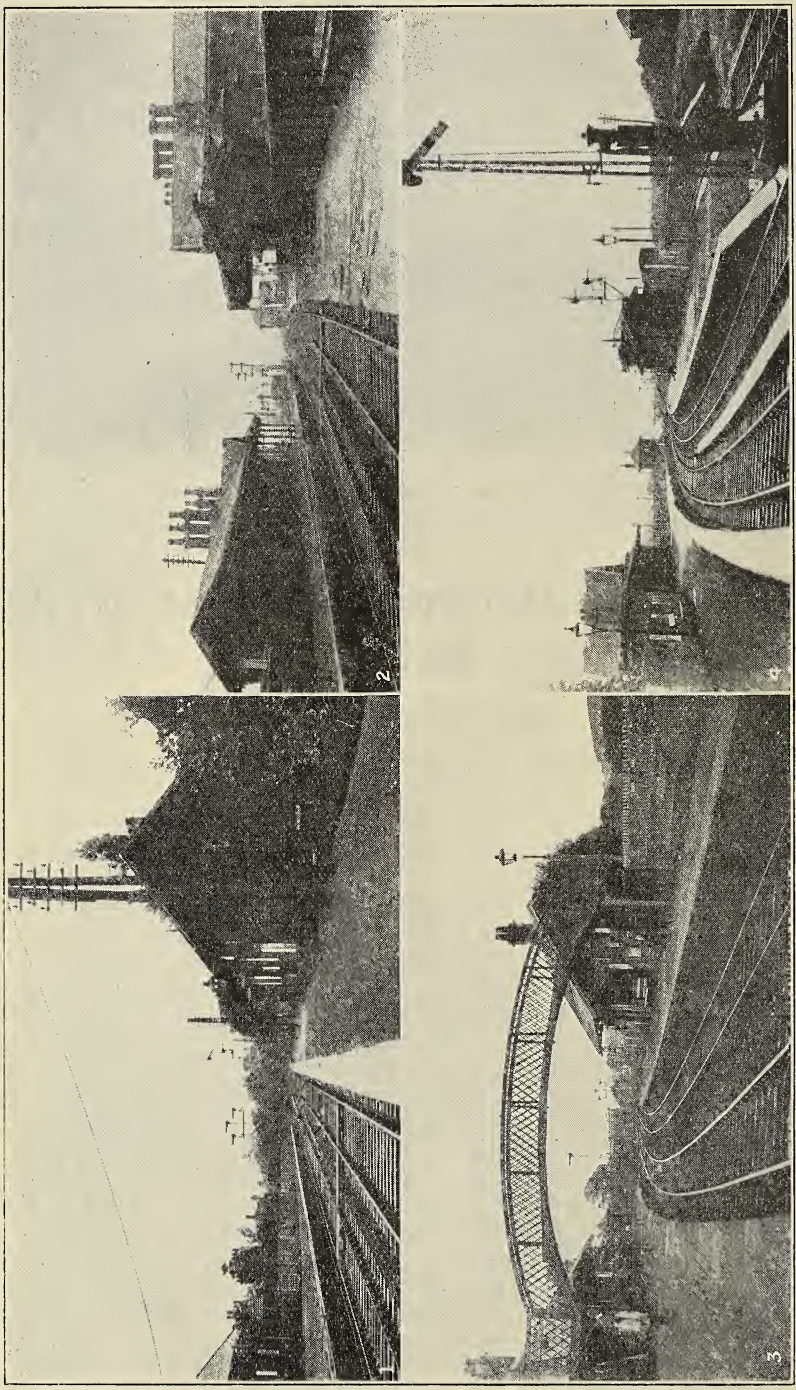
The Glasgow, Barrhead & Kilmarnock Joint Railway.

By J. FRANCIS.

(*Photographs of Stations by the Author.*)

THIS railway, for many years regarded as an essential part of the Glasgow-Carlisle main line of the Glasgow & South Western Railway, will attain its jubilee on June 26, 1923, the section from Stewarton to Kilmarnock and the Beith branch having been opened on June 26, 1873. Previously, the Glasgow & South Western Company operated its traffic from Glasgow, via Paisley, Dalry and thence to Kilmarnock. The Kilmarnock Direct Railway had, however, been projected, but in view of the fact that the Caledonian Company was also associated with schemes for the Glasgow, Barrhead & Neilston Direct and Glasgow Southern Terminal Railways, and that the Crofthead and Kilmarnock Extension had been proposed, the Kilmarnock Direct Railway was abandoned in favour of a joint scheme for a line from Glasgow to Kilmarnock via Crofthead, authorised by Act of July 12, 1869, in which the two companies were jointly interested, each appointing four directors. The Caledonian Company had already constructed a line from Glasgow to Neilston. The extension to Stewarton was opened on February 15, 1871, and to Kilmarnock, with the Beith branch, as already mentioned, on June 26, 1873.

As first constructed, the Glasgow terminus was in what is now the South Side goods station, a short distance south of Gorbals station. This remained in use for some time afterwards, but when St. Enoch station was completed in 1877, the South Side station was given over entirely to goods traffic. Some of the original premises can still be identified, while the courtyard of the station is now a small recreation ground for children. The Joint Line, therefore, commences really at Gorbals Junction, platforms being, in fact, provided only on the Joint Line, the four tracks of the Eglinton Street and Paisley routes curving away directly alongside the station, but having no platforms. Just north of Strathbungo station connection is made with the



STATIONS ON THE GLASGOW, BARRHEAD AND KILMARNOCK JOINT RAILWAY.

1. Pollokshaws. 2. Barrhead (Joint).
3. Lugton. 4. Stewarton.

Caledonian Railway, this being the route for passenger trains from Glasgow (Central) station. There is, however, an intermediate connection for traffic from the Motherwell direction at Langside Junction, between Gorbals and Strathbungo. At Busby Junction, 37 chains beyond Pollokshaws passenger station, Caledonian trains for Busby and East Kilbride leave the joint line. At present the section from Strathbungo to Busby Junction is the only part of the Joint Railway over which the Caledonian runs regular passenger trains, though, in the past, that company made greater use of the Joint Line, and is entitled to do so still. For goods traffic the Caledonian Company makes use of the whole length of the Joint Line, though as it constitutes, in effect, the main line to England of the Glasgow & South Western Company, their traffic, both passenger and goods, naturally predominates.

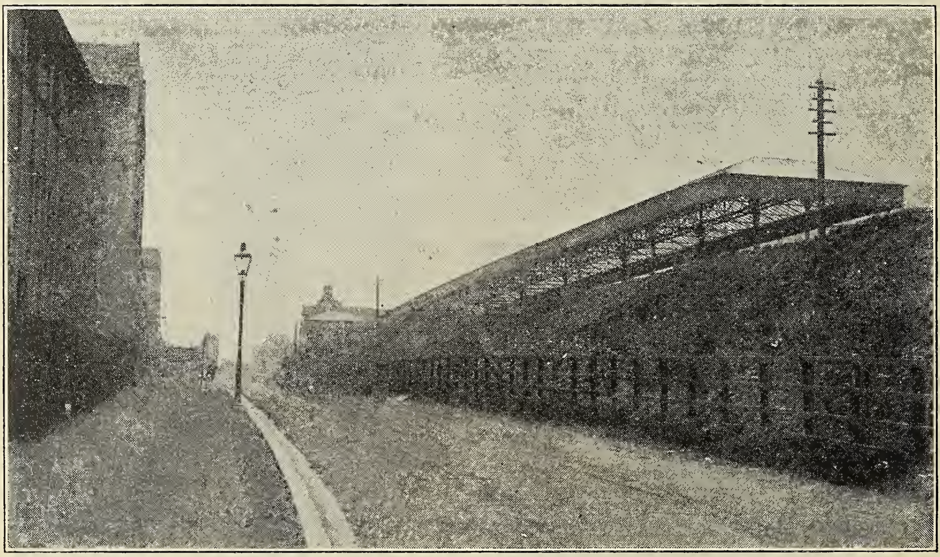
Between Glasgow and Pollokshaws the stations are fairly close together, and were it not for the fact that the district is so well served by electric tramways, and both the Caledonian and Glasgow & South Western Companies have for many years adopted the policy of cultivating outer suburban traffic rather than of attempting to meet the short-distance requirements of so congested a district, these would all be busy inner suburban stations. As it is, sufficient trains are provided to meet the passenger traffic requirements of these stations at busy periods and to enable Glasgow business people to take their mid-day meals at home. Kennishead and Nitshill serve rather attractive residential districts, the crowded environs of Glasgow having by this time been left behind. At Kennishead a goods branch to Spiersbridge diverges, this serving several industrial establishments, while at Nitshill there is a colliery branch.

Barrhead (Joint), the next station, serves the busy industrial town of Barrhead. At one time the traffic of the town was thought to justify more extensive railway facilities, and, in addition to the Joint station, the Glasgow & South Western Company constructed a branch to a more central station, operating trains thereto; also from Paisley via Potterhill. The latter service was, however, discontinued after September, 1907, and during the war (in January, 1917) Barrhead (Central) was closed and all traffic diverted to the Joint Line station, where it still continues to be dealt with. The Caledonian trains from Glasgow (Central) to Kilmarnock via the Joint Line were also withdrawn in January, 1917, by mutual arrangement between the companies. The Central station at Barrhead, notwithstanding that it has one fine double-sided terminal platform, well sheltered from end to end, and with modern station buildings, is meantime closed, the extra expense involved in staffing it under the present conditions of high costs and reduced traffics outweighing any benefit likely to be derived from its re-opening, at least until the prevailing depression in trade has passed and traffic has improved. Furthermore, alongside it, separated only by a public road, is Barrhead (New) station, on a branch of the Caledonian Railway, which was never even opened for traffic, so that (as one of the photographs reproduced shows) it is possible to include in one view parts of two railway stations, neither of which is now in use, and one of which was never opened for traffic, and, as regards the station buildings, is partially derelict. Associated with the Joint Line there is a goods and mineral depôt, and considerable sidings are in evidence, indicating that, although all traffic is now concentrated at the Joint station, Barrhead is well supplied with railway facilities and that this busy town is responsible for traffic to an important degree. Although the Joint Line has fewer trains than in pre-war days between Glasgow and Barrhead, there are reasonably frequent stopping trains throughout the day, including some which terminate at Barrhead (Joint), and at busy hours the facilities are quite sufficient to meet the needs of residential traffic.

Two miles beyond Barrhead is Neilston station, also in considerable favour for residential purposes. At this point the Caledonian route from Glasgow to Ardrossan, via Muirend and Patterton, comes within a short distance of the Joint Line, though, owing to high land intervening, not much of it can be seen from the latter. Near Caldwell, however, the Caledonian line comes into view, the station thereon, known as Uplawmoor, utilising, in fact, the correct name of the district, Caldwell station obtaining its name from the Caldwell estate. The two lines continue parallel until beyond Lugton station. A connecting line is provided between them north of the respective stations, which are almost alongside one another, and interchange sidings are provided adjacent to the Joint Line station. The latter is a junction, the branch to Beith diverging to the west also serving several industrial establishments. The main route towards Kilmarnock continues southward, and passes under a girder bridge carrying the Caledonian branch to Ardrosssan, which approximately parallels the Beith branch as far as Barrmill, where, in fact, a connection is provided, though it is not at present in use. From Barrmill the Beith branch continues as a single line to its terminus. The station has a single platform, with goods yard adjoining, and deals with a considerable goods traffic. It is, however, about a mile distant from the Glasgow & South Western Beith station on the Glasgow-Ayr main line.

South of Lugton the Joint Line traverses country which virtually all the way to Kilmarnock has no other railway facilities within several miles. Dunlop serves a somewhat interesting residential district, while Stewarton deals with the traffic of a considerable manufacturing town; Kilmaurs, the last station on the Joint line, may be regarded almost as a suburb of Kilmarnock. At the latter place the Glasgow, Barrhead & Kilmarnock Joint Railway exercises running powers into the Glasgow & South Western station, though it has its own goods depôt.

Although the Glasgow, Barrhead & Kilmarnock Joint Railway is utilised by the Glasgow & South Western Company as its main route to the south, it is by no means an easy one. In fact, it is characterised by very steep gradients, including 1 in 100 to reach Barrhead from the North, 1 in 67, 78 and 69 thence to Neilston, and 1 in 70 for 1½ miles to the summit between Neilston and Caldwell. North-going trains have to face adverse grades at 1 in 180, 87, 152 and 75 to the summit near Dunlop, and there are shorter lengths at steep grades for trains in both directions. Once clear of the Glasgow district, however, the country traversed is, on the whole, somewhat picturesque. At Crossmyloof, though within the Glasgow area, the train passes between extensive allotment gardens, with numerous glasshouses, the combination providing, in fact, a distinctly interesting view from the train. Pollokshaws



BARRHEAD (NEW), AND BARRHEAD (CENTRAL) STATIONS.

The former, to the left, was never opened, and the latter, closed during the war, has not yet been brought again into use.

station is also rather prettily situated, with platform gardens. At Kennishead the station is situated somewhat picturesquely on an embankment. At Nitshill a memorial stone is erected on the down platform—

> "IN
> MEMORY OF
> SERGT. JOHN MEIKLE, V.C., M.M.
> LATE CLERK AT NITSHILL STATION,
> WHO ENLISTED IN H.M. FORCES
> (SEAFORTH HIGHLANDERS),
> 8TH FEBRUARY, 1915, DURING THE
> GREAT WAR, AND WAS KILLED IN
> ACTION ON 20TH JULY, 1918.
> ERECTED BY HIS RAILWAY COMRADES."

Between Barrhead and Neilston interesting views are had over the surrounding country, and for some distance a rushing stream immediately parallels the line, being carried, in fact, between retaining walls alongside the track. On the Beith branch a good view is obtained of a viaduct carrying the Caledonian Company's Ardrossan line across the valley. The branch is double track from Lugton to Barrmill Junction, but the station has only a single platform on the up side. This constitutes the checking station for trains in both directions, Beith tickets being collected on the outward journey and examined when returning from Beith.

As already indicated, all passenger trains on the Joint Line are now provided by the Glasgow & South Western Company, including locals between Glasgow and Barrhead and one or two which terminate at Neilston, except for Caledonian trains between Strathbungo and Pollokshaws (as previously referred to) and in regard to the Beith branch from Lugton.

Local services between Lugton and Beith are worked in connection with trains between Glasgow and Kilmarnock. For ordinary passenger trains the Joint line owns two six-wheeled vehicles. One is a first and third composite and the other a first, third and brake composite. They are painted in the old Caledonian livery, as still used for Cathcart Circle trains in Glasgow, but are lettered "G.B. & K." and numbered 1 and 2. Certain of the branch trains are mixed, and in that case a Caledonian four-wheeled vehicle is sometimes used in place of the Joint Line coaches, the guard travelling in a goods brake van. The locomotive used at the time of the writer's visit was a Caledonian Railway 4–4–0 tank engine, No. 11, of the black-painted condensing class.

There are, however, two through trains each way between Glasgow and Beith, leaving St. Enoch at 6.25 a.m. daily, 1.8 p.m. on Saturdays, and on other days at 5.5 p.m., in each case calling first at

BEITH STATION.

Showing branch train, with G.B. & K.J.R. vehicles and C.R. 4-4-0 tank engine.

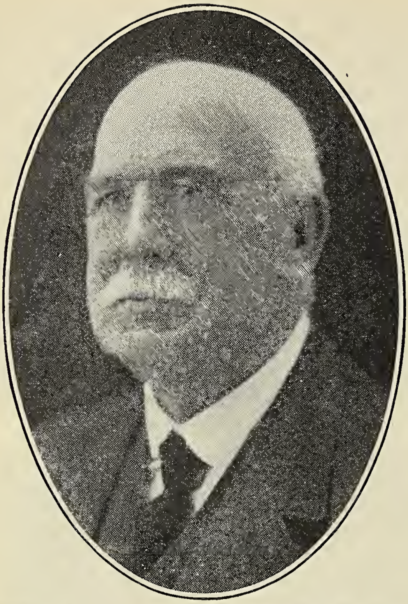


Photo.] [*Whyte & Sons.*

MR. J. KERR,

Secretary and General Manager, Glasgow, Barrhead & Kilmarnock Joint and Glasgow & Paisley Joint Railways.

Barrhead (Joint), the corresponding down trains leaving Beith at 7.53 a.m., on Saturdays at 2.25 p.m., and on other days at 6.10 p.m. These trains are worked by a Glasgow & South Western 0–4–4 tank engine and that company's rolling-stock. Traffic arrangements on the Joint Line as a whole give good facilities to suit residential traffic. Thus the 7.52 a.m. from Kilmarnock runs non-stop from Dunlop to Gorbals, while the 8.50 calls only at Barrhead (Joint) in addition. The 7.53 from Beith is fast from Barrhead (Joint) to Gorbals, and all stations obtain at least one, if not two, trains to Glasgow due in St. Enoch between 8.30 and 9 a.m. In the opposite direction the 5 p.m. Kilmarnock train calls only at Barrhead (Joint) to pick up before reaching Lugton, while the 5.5 p.m. Beith train serves stations between Barrhead and Lugton. The 5.35 p.m. provides a non-stop train for Kilmarnock, and the 6 p.m. serves all stations from Barrhead onwards. Stopping trains for stations to Barrhead are provided at 5.10, 5.40 and 6.10, the last-mentioned being continued to Neilston. On Saturday afternoons there are corresponding fast trains at 1.3 p.m. (first stop Dunlop), 1.8 p.m. (first stop Barrhead), and 1.35 p.m. (first stop Lugton), with through expresses to Kilmarnock at 12.10 and 2 p.m., and stopping trains to Barrhead or through to Kilmarnock at 12.20, 12.45, 1.12 and 2.2 p.m. As usual in Glasgow, trains are provided to enable season-ticket holders to travel homeward for the mid-day meal, the trains in principal favour being the 12.32 and 12.55 p.m. from St. Enoch, and trains due back at 1.45 and 2 p.m.

Caledonian trains on the Glasgow–East Kilbride route which serve Strathbungo, Crossmyloof and Pollokshaws stations on the Joint Line are fairly numerous. The 7.50 a.m. from East Kilbride calls only at Pollokshaws on the Joint Line; the 8.10 and 8.50 a.m. are fast from Busby, and therefore pass all Joint Line stations; the 8.26 from Busby calls only at Strathbungo; and the 8.45 a.m. from Busby omits all Joint Line stations. Including stopping trains there are six trains on this route due in Glasgow (Central) between 8.27 and 9.38 a.m. For the evening traffic, trains leave Glasgow (Central) for East Kilbride or Busby at 5.9, 5.35, 6.6 and 6.23 p.m., and on Saturday afternoons at 12.54, 1.6, 1.30 and 2.35 p.m., several being fast, and in some instances passing some or all of the Joint Line stations. On this route, also, there are midday trains outwards from Glasgow (Central) at 1.6 p.m. (fast) and 1.8 p.m., with return trains due at 2.13 and 2.38 p.m. In this case there is no great need for facilities in regard to inner suburban stations, in that Strathbungo, Crossmyloof and Pollokshaws are served by trains from and to St. Enoch, besides being within easy distance of stations on the Cathcart Circle line.

No mention has been made of the through Glasgow–Carlisle expresses which also traverse the Joint Line, in that passengers are not as a rule allowed to travel by these between Glasgow and Kilmarnock. The non-stop facilities between these two places are usually given by main line trains serving principal or all stations south of Kilmarnock. There are, however, sufficient fast trains to meet the requirements of the important business travel between Glasgow and Kilmarnock, the restriction upon passengers using the through Anglo-Scottish trains being mainly due to the fact that they have sufficient traffic on their own account.

Goods traffic on the Joint Line is chiefly dealt with by the Glasgow and South Western Company, in that it is so largely associated with its through traffic. The Caledonian Company, however, comes upon the Joint Line at several places, and in the aggregate takes a good share in the goods and mineral traffic.

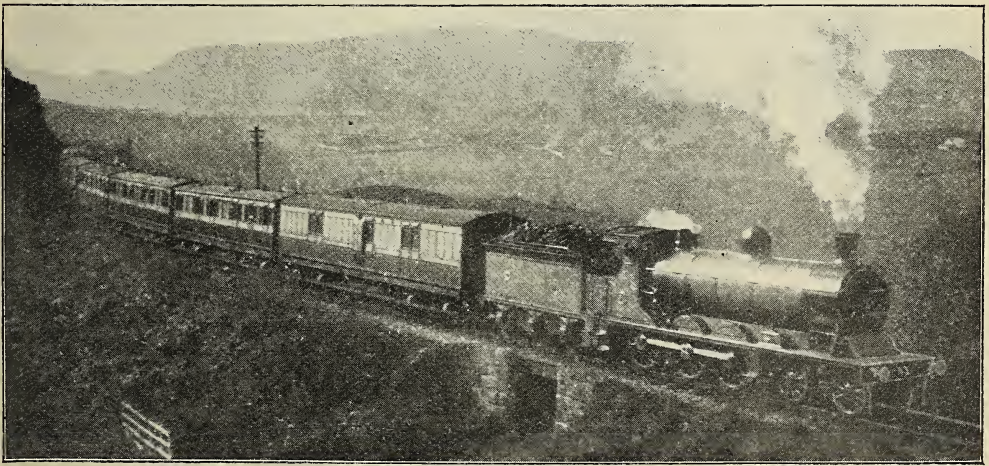
The Glasgow, Barrhead and Kilmarnock Joint Railway is maintained by the railways concerned. It has its own operating and traffic staff under the direction of Mr. J. Kerr, who has for the past 23 years held the position of Secretary and Manager. Mr. Kerr entered Joint Line service in 1874, previous to which he was for eight years with the Caledonian company.

Until 1915 the Glasgow, Barrhead & Kilmarnock Joint Line had its own engineer, but since that date the Chief Engineer of the Glasgow and South Western Railway has been responsible. We are indebted to Mr. Kerr, also to Mr. Cooper, General Manager and Mr. Armstrong, Superintendent of the Line, Glasgow and South Western Railway, and their assistants, for material utilised in the compilation of this article.

Photo] [*J. B. Sherlock.*

CALEDONIAN RAILWAY:

9.45 a.m. Glasgow train leaving Oban station. 4-6-0 locomotive No. 52.



Photo] [*Mr. R. A. Chrystal.*

CALEDONIAN RAILWAY.

Passenger train ascending 1 in 50 bank near Oban.

June 1908

Running Powers and Working Arrangements.

(2) CALEDONIAN, GLASGOW AND SOUTH-WESTERN, GREAT NORTH OF SCOTLAND, AND HIGHLAND RAILWAYS.

By E. Boyd Hutchinson.

THE intricacies of railway working fill many volumes which are alternately the delight and the horror of the railway enthusiast. The delight because many of these matters, although shown in Acts of Parliament, are now, when translated into the official literature of the "Iron Road," marked "Private," and are known by comparatively few persons, even in the railway service. On the other hand, these rules, regulations, agreements, and working arrangements are the terror of many a man on account of their involved nature and the multitudinous details with which they are packed.

Among the railway arrangements of which the general public ordinarily know little or nothing are what are termed "running powers." These may be defined as powers possessed by one railway company of running its trains over the lines of another company. The portion of the line thus covered is considered in a matter of charges against traders as belonging to the railway exercising these powers.

Running powers are usually granted—

(1) As the price of an amalgamation (Scottish Central – Scottish North-Eastern and Edinburgh and Glasgow amalgamations).

(2) As the price of the withdrawal of a Bill in Parliament (Alloa Railway).

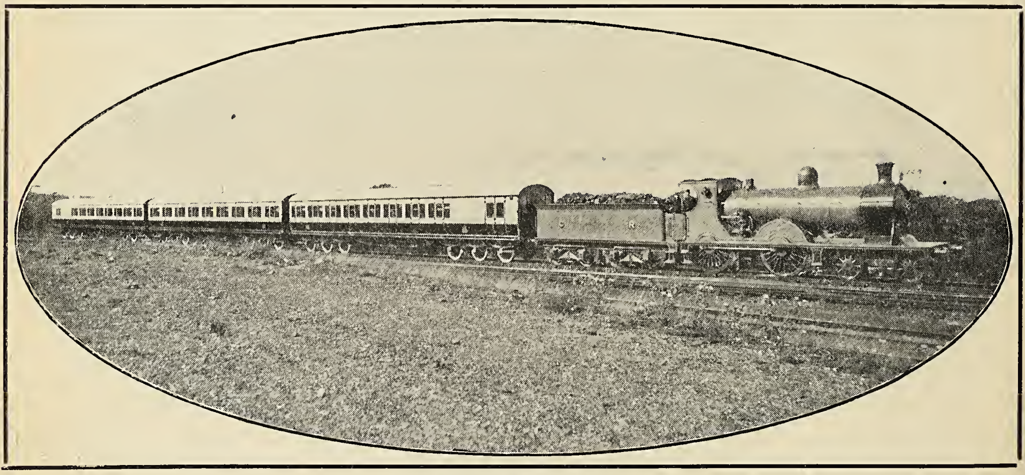
(3) As the price of the non-construction of an authorised line (Grahamston).

(4) As the price of withdrawing opposition to a proposed new line (Renfrew Branch and Muirkirk Branch).

(5) To equalise competition (Bo'ness).

(6) To get a terminus (Dumfries).

(7) To provide communication from the system of the running company to the system of a third company (Gretna).



CALEDONIAN RAILWAY.

Edinburgh-Aberdeen Express on North-British Railway near Falkirk.

(8) By agreement (North British Railway over Glasgow and South-Western Railway and *vice versa*).

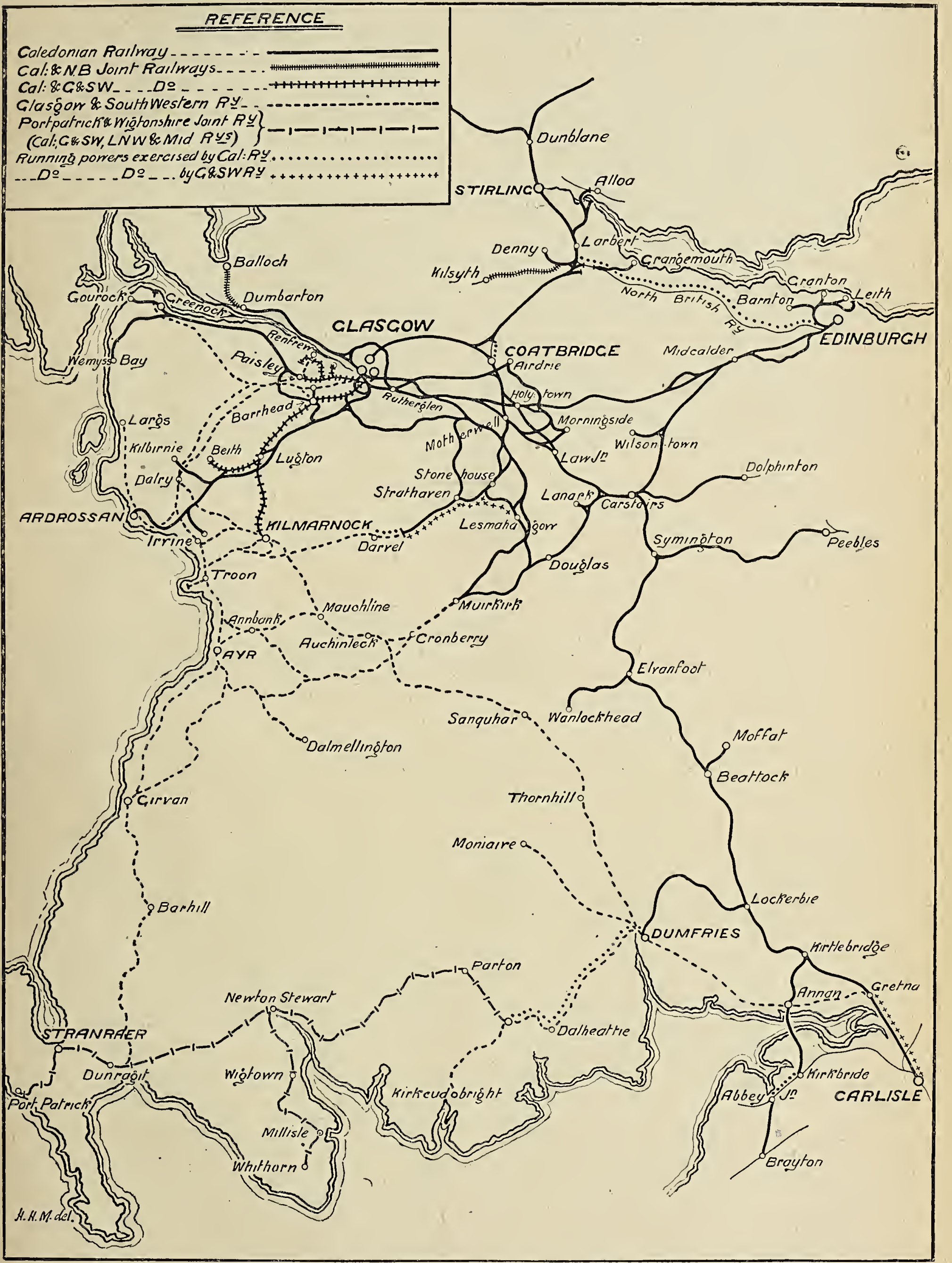
There are various modes of payment—

(*a*) A mileage proportion of the through rate fare; or

(*b*) An agreed sum per passenger, or per ton, for the whole distance; or

(*c*) An annual payment, or toll, for the use of the line.

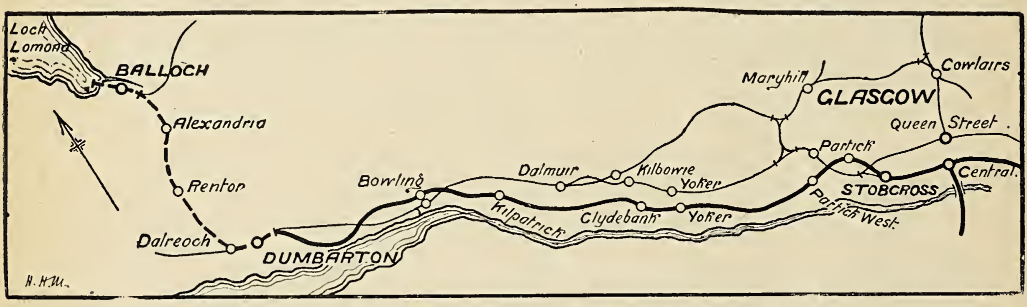
There are many strange examples of running powers existing to-day; indeed, it



MAP SHOWING RUNNING POWERS EXERCISED BY THE CALEDONIAN AND GLASGOW AND SOUTH-WESTERN RAILWAYS.

might be quite possible for a railway to own no railway at all, but merely to run over the lines of other companies. The North London Railway approaches this ideal condition, for, although only owning 12 miles of railway, it actually runs its trains over 51 miles of foreign track, as well as possessing powers over nearly double this mileage.

Although running powers are varied and numerous in England, as instance the Great Central over 169 miles of Great Northern track, and Great Northern over 326 miles of Great Central rails, they are completely surpassed by those prevailing in Scotland. The proverbial jealousies existing between various clans in the Northern Kingdom have been amply verified by the story of Scottish railway extension. Not a move on the part of one company but the other must have a hand in the pie, and the fiercest competition existed between the three leading Scotch lines before the Caledonian–North British Railway *rapprochment* of 1907-8. Hardly a point on the Caledonian Railway's system but was pressed by either the North British Railway or Glasgow and South-Western Railway, and the same might be said of the North British Railway system, with the exception of Fife, which has always been a preserve of theirs, and one which has been most jealously guarded against the intrusion of the inquisitive but resourceful Caledonian Railway.



SKETCH MAP OF RAILWAYS BETWEEN GLASGOW AND BALLOCH.
(For references see diagram on page 507.)

The North British Railway has, at various times, tried to enter the busy mineral district around Motherwell, called by a leading North British counsel "the domestic hearth of the Caledonian." The last occasion was in 1891, and at the same time the Caledonian Railway attempted to get into Fife, in spite of previous failures. Both schemes were defeated, although the Caledonian Railway Bill passed the Commons and was only rejected by the Lords. Since then rumour has it that there has been a tacit understanding between the two companies that as soon as the North British Railway tries to enter the Motherwell district the Caledonian Railway will do the same to Fife. Fortunately, perhaps, for both, the new peace agreement will prevent further attempts by either railway for a considerable time to come.

During the last twenty years the Caledonian Railway has been winning in the game of expansion, as witness the Gourock extension, the Lanarkshire and Dumbartonshire line and the Lanarkshire and Ayrshire Railway. But in these days it is a dangerous business at best, and a railway seldom escapes from the game without getting its fingers burned.

On several occasions, however, the parties, rather than allow a new line to be built into a district already served, have agreed to make the existing one 'joint.' An excellent example is furnished in the instance of the Lanarkshire and Dumbartonshire Railway, which is worked, managed, and practically owned by the Caledonian Railway. The line, as placed before Parliament, extended from Stobcross (Glasgow) to Aber Bay, Loch Lomond. Parliament passed the line between Stobcross and Dumbarton, but rejected the portion between Dumbarton and Loch Lomond. The Lanarkshire and Dumbartonshire Railway was not satisfied with this, and the following year it deposited a Bill to continue its line to Loch Lomond. Negotiations were entered into, and the North-British Railway agreed that, if the Lanarkshire and Dumbartonshire Railway withdrew its Bill, it would make the line between Dumbarton and Balloch and the steamboats on Loch Lomond joint. This was done—I am afraid, to the mutual dissatisfaction of both parties. The North

British Railway, because its rivals had penetrated what it considered as its own territory, and the Caledonian Railway, because it did not get as much as it would have liked, and the results were not so favourable as it had anticipated.

At other times, and more often, the difficulties have been met by the granting of running powers and by the provision of facility clauses. These powers, as before stated, are more widely possessed over Scottish railways than over any other in the United Kingdom, although they are, in the majority of instances, so far as practical use is concerned, as good as dead and buried. These extensive privileges were conferred by Parliament more with the idea of safeguarding the various railway interests than with the idea that they would be carried into effect. It is certainly fortunate that this is the case, as the present arrangements are designed to prevent fierce and ruinous competition. Thus, in several instances where running powers were exercised formerly, the 'foreign' trains have been withdrawn, principally, it is true, to suit the convenience of the 'foreign' line, but also from the fact that the management apparently re-discovered the old proverb which says that "what is ample for one is scanty fare for two." For instance, Caledonian Railway trains used to work from Glasgow (Queen Street station), North British Railway, to the North. The last Caledonian Railway train from Queen Street left that station on the night of December 31st, 1869, and had the misfortune to be involved in the famous collision at Forgandenny. Since January 1st, 1870, all the Caledonian Railway's trains for the North have left Glasgow from their own station at Buchanan Street.

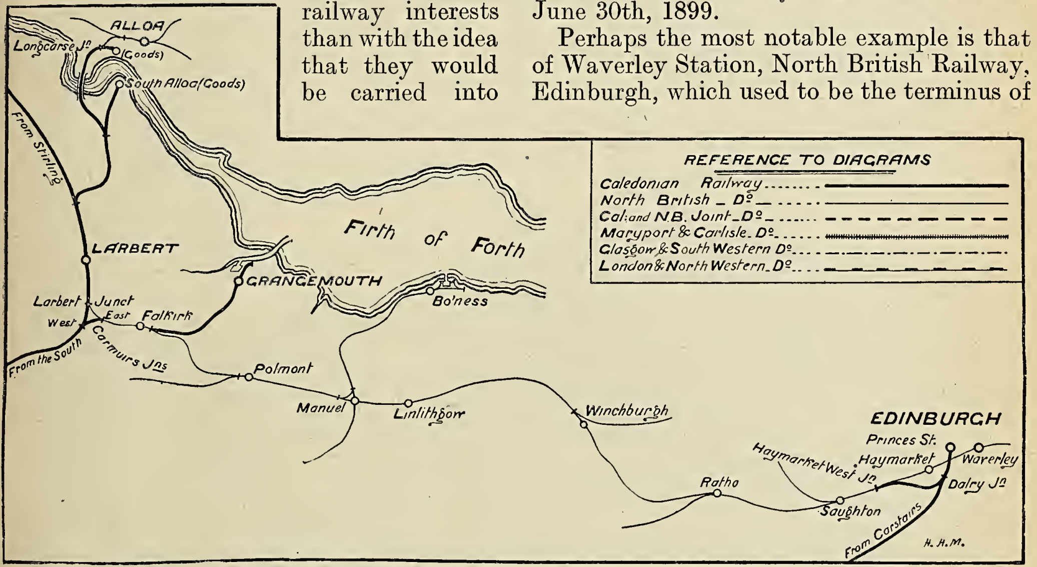
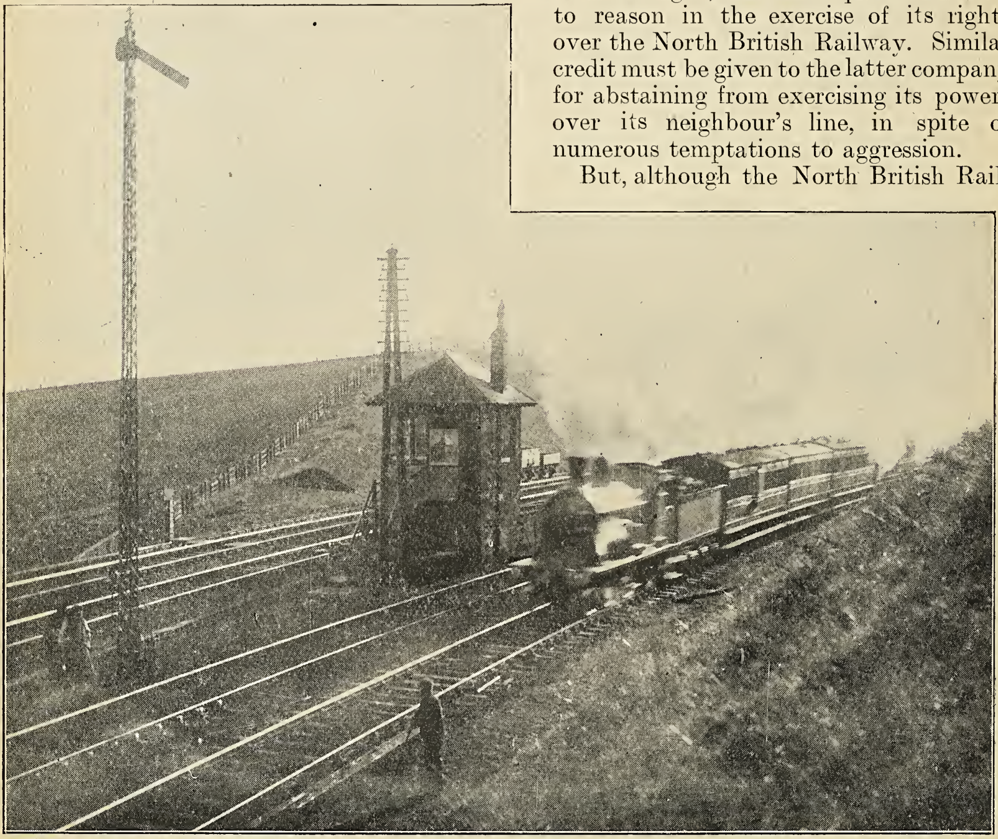


DIAGRAM SHOWING THE CALEDONIAN RAILWAY'S RUNNING POWERS BETWEEN LARBERT AND EDINBURGH.

North British Railway trains used to be run over the Caledonian Railway (then Scottish Central line) between Greenhill Junction and Larbert Junction and Perth, but this was given up many years ago, and the Caledonian Railway horsed the trains north of Larbert until they were withdrawn on the opening of the Forth Bridge.

The Caledonian Railway also ran its trains from Montrose to Bervie on the Aberdeenshire coast, and from Larbert to Bo'ness. Both services were discontinued, the first in October, 1898, and the latter on June 30th, 1899.

Perhaps the most notable example is that of Waverley Station, North British Railway, Edinburgh, which used to be the terminus of all Caledonian Railway trains between Edinburgh and the North. On October 1st, 1890, these trains made their own enlarged Princes Street Station their terminal. It was strange, to say the least, that the Caledonian Railway should have made its Edinburgh terminus in the headquarters of its great rival, and many stories are told of the jealousy existing and the friction caused by the arrangement. One survival of these old days is shown in the fact that the Caledonian Railway still possess at the present day a commodious office in a prominent position on the main platform at Waverley station. Of course, the staff were withdrawn about the same time as the trains. Even at the present time, the Caledonian Railway, in order to reach Edinburgh from the North, has to run over 25 miles of North British Railway from Larbert Junction to Haymarket West Junction, Edinburgh. Naturally this is very inconvenient, for that portion of the line is somewhat crowded, and when the Caledonian Railway wish to alter the times of its trains, it cannot be done without considerable difficulty. In fact, many promising schemes in the past have been completely frustrated by this awkward little bit of line.



KINNABER JUNCTION, FROM WHICH TO ABERDEEN, THE NORTH BRITISH RAILWAY EXERCISES RUNNING POWERS OVER THE CALEDONIAN RAILWAY.
The Caledonian line is in the foreground, and the North British line to the rear.

If the Caledonian Railway is in the hands of the North British Railway at this point, the tables are turned between Kinnaber Junction and Aberdeen, a distance of 38 miles, which is all Caledonian Railway territory. But it must be placed to the credit of our premier Scotch railway that it has not taken a mean advantage over its neighbours, for North British Railway trains always receive every consideration in its hands. If, indeed, in old times hostilities had rendered it desirable to block each other's trains, both companies would have been in an awkward predicament, for both held trump cards.

Besides the aforementioned powers, the Caledonian Railway is at liberty to run over all North British Railway lines north of the River Tay, and although these are not many at present, perhaps they may be extended later on.

The Caledonian Railway, it must be acknowledged, has been quite amenable to reason in the exercise of its rights over the North British Railway. Similar credit must be given to the latter company for abstaining from exercising its powers over its neighbour's line, in spite of numerous temptations to aggression.

But, although the North British Railway has made little use of its privileges, there are exceptions. These, however, will be specially considered in an article dealing with that railway's running powers, the principal being the line between Kinnaber Junction and Aberdeen.

It is little known, I think, that the Caledonian Railway does NOT possess a through track of its own from Carlisle to Aberdeen. There is a break of 52 chains near Coatbridge, where the North British Railway line is traversed from Gartsherrie Junction to Garnqueen South Junction. Travelling from the North in a comfortable Caledonian Railway carriage, the regular traveller can tell at once when passing over this stretch. What the difference in the track actually is, I would not venture an opinion, but the undoubted fact remains, explain it who will.

Turning to the south of Scotland, we find that the North British Railway run its Gretna Branch trains over 24 chains of Caledonian Railway line to Gretna Junction, whence they proceed to Gretna Green station, Glasgow and South-Western Railway. In connection with this line, there exists what is apparently a very strange fare anomaly. The first-class fare between Edinburgh (Waverley) and Gretna is similar to that charged to Gretna Green. The case of the third-class single is very different. The passenger travelling the extra mile to Gretna Green from Gretna must pay 5d. more. Stranger still, with a return ticket, the difference in the fares between Gretna and Gretna Green amounts to 1s. 6d., or nearly four times the difference which exists on the single fare; and this difference exists in the face of the fact that the passenger can, by local booking between Gretna (Caledonian Railway), which is adjacent to the North British Railway station, and Gretna Green, go and return for the modest sum of 2d. The explanation of this, so far as the single ticket is concerned, is that the Caledonian Railway, by statutory powers, is enabled to charge the North British Railway 4½d. for every passenger passing over its line at this point. The return fare is evidently calculated on a different basis.

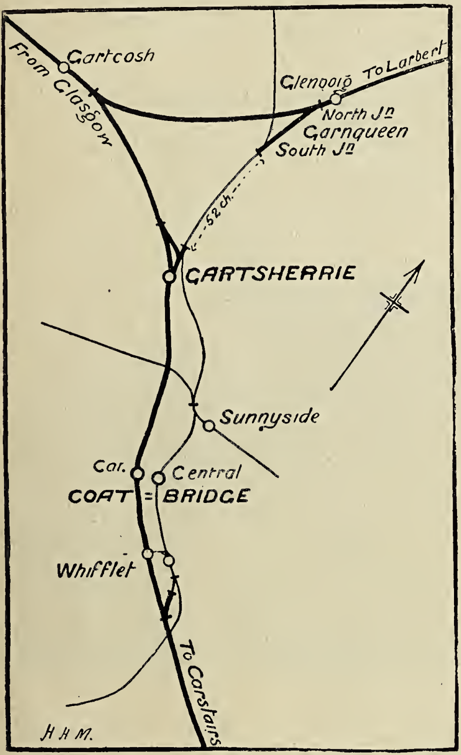


DIAGRAM SHOWING THE CALEDONIAN RAILWAY'S RUNNING POWERS OVER THE NORTH BRITISH RAILWAY AT GARTSHERRIE.

	Edinburgh (Waverley).							
	Single.				Return.			
	1st.		3rd.		1st.		3rd.	
	s.	d.	s.	d.	s.	d.	s.	d.
Gretna.. ..	15	4	7	7½	25	9	13	0
Gretna Green	15	4	8	0½	25	9	14	6

All Glasgow and South-Western Railway (as well as North British Railway) trains to and from Carlisle and the south must pass over the Caledonian line. The former from Gretna Junction, distant 8½ miles from Carlisle; and the latter from Port Carlisle Junction, 1 mile away. Carlisle station, although owned by the London and North-Western and Caledonian Railways, yet houses five other railways which run into it.

The Solway branch of the Caledonian Railway is little known, but it possesses points of interest for the railwayist. The line passes over the estuary of the Solway by one of the longest bridges in Great Britain, over a mile in length. A considerable number of people, and particularly cyclists, use the railway between Annan station and Bowness station on the opposite side, as this is the first bridge across the estuary of the Solway, and after it there is not another for 18 miles up the river. South of the Solway the Caledonian Railway train soon leaves its own line at Kirkbride Junction for that of the North British Railway's Silloth Branch (into which place, by the way, it possesses running powers over the North British Railway from Carlisle), which it runs over for 3 miles 68 chains. Reaching Caledonian Railway metals again at Abbey Junction, the train finally leaves them 5 miles further on for the track of the Maryport and Carlisle Railway coming to rest in Brayton station of that company. It is a strange little branch, and probably not a very paying one, but of undoubted and unique interest in several directions.

Turning now to the South-West of Scotland, the "happy hunting ground" of the Glasgow and South-Western Railway, we find that the Caledonian Railway houses its Dumfries branch trains in the Glasgow and South-Western Railway station at that place. It also possesses powers whereby it may run its trains from Dumfries to Castle Douglas, and also from Murkirk or Darvel, to Ayr and Troon, so that the "South-Western" monopoly may, perhaps, not be quite so secure as it looks! On the other hand, the Glasgow and South-Western Railway may run its trains over the Caledonian Railway from Muirkirk to Edinburgh, Leith, and Granton.

The Caledonian Railway long ago did actually run its trains over the Glasgow and South-Western Railway line between Muirkirk and Ayr in respect of the powers conferred on it by the Act of 1865, but this has long since ceased, and the only sign of any such arrangement is shown in the fact that through carriages are run between Ayr and Edinburgh *viâ* Muirkirk, but this convenience hardly receives the support it perhaps deserves. Possibly this may be partly accounted for by the working of the service, for, after being shunted from numerous trains on to numerous other trains, and after due intervals have elapsed at the various junctions, the passengers are often backsore and weary when they arrive at the gates of "Modern Athens." During the summer months the Caledonian Railway works a large number of excursions to Ayr by these routes, but the engines are, in every case, changed at Muirkirk or Darvel, as the case may be.

The Glasgow and South-Western Railway has powers to run its trains over the Caledonian Railway's new line from Darvel (county boundary) to Strathaven and Lesmahagow (*viâ* Stonehouse). They are only partially exercised, however, one Glasgow and South-Western Railway's goods train coming daily to Strathaven. The passenger traffic between Darvel and Strathaven is arranged on a different basis, the Caledonian Railway working the whole of the traffic for half the year, leaving its friendly rivals to work it for the remaining six months. The same arrangement, I may say, is carried out in the case of the joint line from Glasgow to Renfrew; and, as matters are going at present, it would seem likely that the future will see an extension of this style of joint working.

(*To be continued.*)

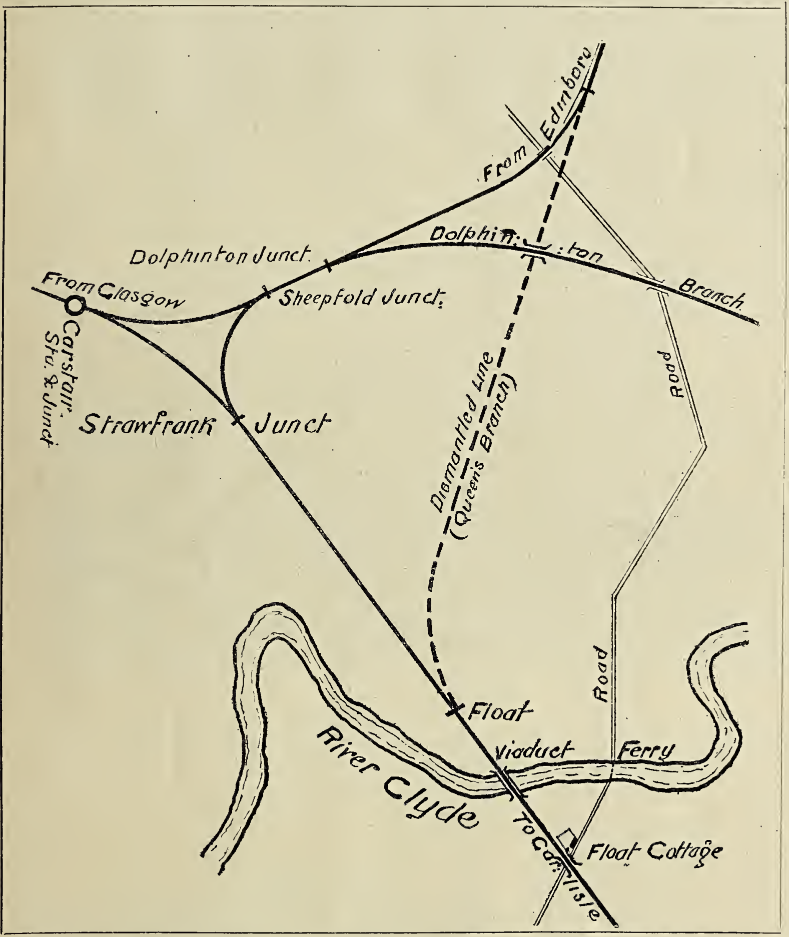
GARTSHERRIE JUNCTION.

Where the Caledonian Railway's trains, between Aberdeen and the South, enter upon a short length of the North British Railway.

RTM Aug 1919

A Railway Made for Queen Victoria.

A LETTER from "Anglo-Scot," reproduced below, has led to the unearthing of an interesting episode in Caledonian Railway history. "Anglo-Scot's" letter is as follows :—



"With reference to the article on the above subject which appeared in the June number of the Railway and Travel Monthly, the writer of the article refers, on page 350, to a disused spur at Carstairs. There is, however, close by, a very much older loop or spur, which has been derelict for many a year. (See sketch plan.) Originally it was apparently constructed for a single line.

"About twenty years ago, when the writer was living in Edinburgh, he often travelled on the Caledonian Railway, between Edinburgh and Carlisle, and when sitting at the left side carriage window, facing the engine, he could distinctly see the track. Of course the rails and permanent way had long ago disappeared.

"This spur connected with the main line from Carstairs to the south at Float.

"Perhaps some of your readers might be able to throw some further light on the subject."

We submitted this query to Mr. W. A. Paterson, the Chief Engineer of the Caledonian Railway, who has been good enough to look into the matter, with the result that the following interesting information has been brought to light.

Mr. W. A. Paterson —whose communication also explains the place name "Float"— states :— "This spur line is generally called the Queen's Branch, and I understand it was constructed to allow of the Royal train running direct to Edinburgh without having to go into Carstairs station, which would have reversed the train.

"The construction of the Queen's Branch was commenced in 1845 and was completed in 1848. It is for the most part an embankment, and the formation is sufficiently wide for two lines of rails, although at the present time there is only the old materials of one line lying in certain places, and there is no evidence that the second line was ever laid.

"There are two lines of rails at the junction near the river Clyde, adjoining the pumping station, and these are used as sidings for the cleaning of cattle wagons.

"I am informed that the royal train, with Queen Victoria, passed over this branch going to and returning from Edinburgh several times, and that the mail train from Edinburgh to the South also used it on one or two occasions, but it was used for no other traffic.

"The Dolphinton Branch was completed and opened in 1867, and the Strawfrank Fork in 1872.

"The Float is a ferry on the river Clyde a little to the east of the railway viaduct, known as Float Viaduct. It ensured the continuity of a public road extending from the Queen's Branch near its junction at the Carnwath end to a level crossing over the railway a little to the south of Float Viaduct. This portion of the road and the ferry at the river are not now used, having been closed when the new road from Strawfrank southwards and the bridge over the river Clyde were constructed."

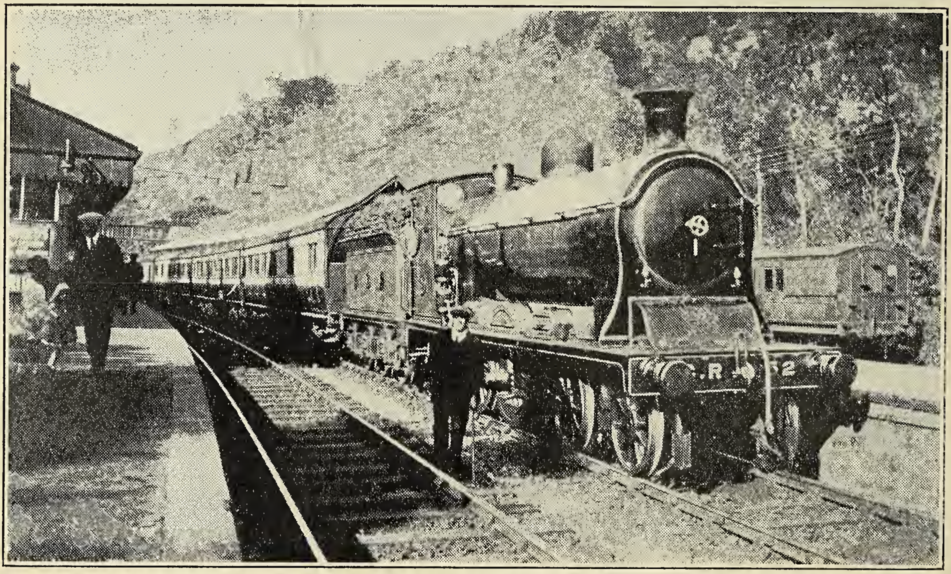
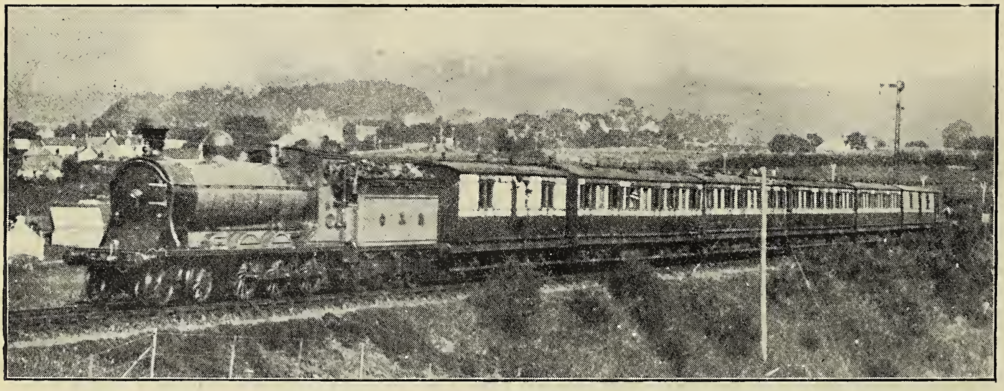


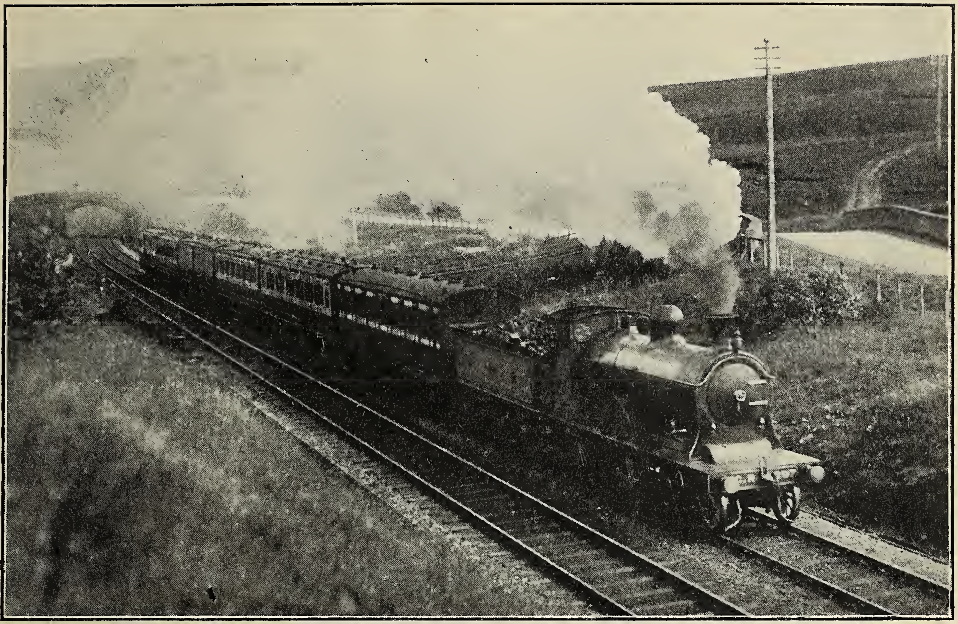
Photo.] **CALEDONIAN RAILWAY.** [*Bernard Whicker.*

Oban–Edinburgh train at Callander. 4-6-0 locomotive (5 ft. class), No. 52.



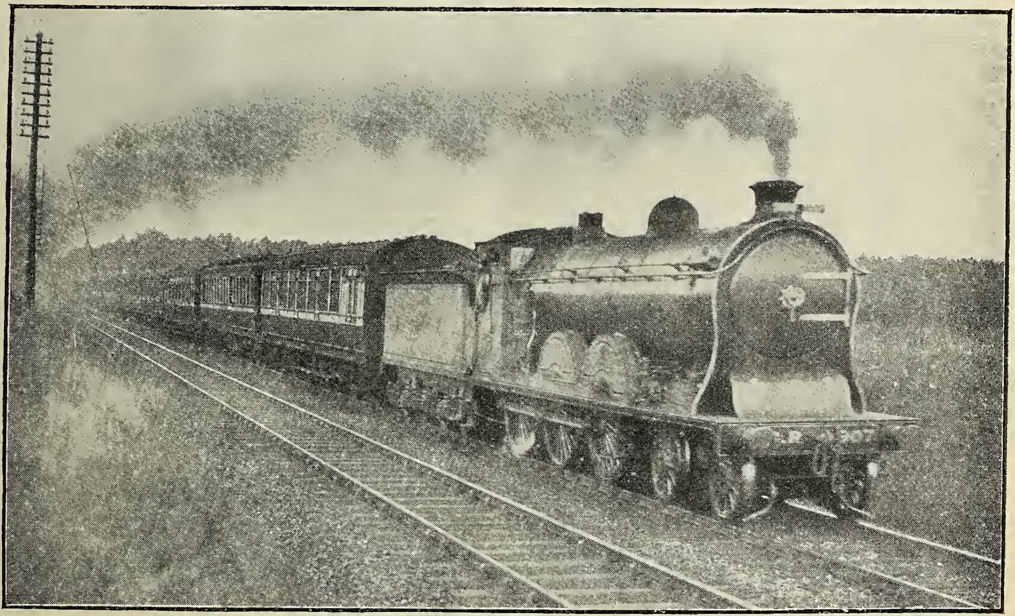
Photo] CALEDONIAN RAILWAY. [*Lieut. B. D. Holberton, R.N.*

Noon Glasgow–Oban Express near Taynuilt. Locomotive No. 51.



Photo] CALEDONIAN RAILWAY. [*Mr. H. Gordon Tidey.*

Glasgow–Carlisle train ascending the Beattock Bank, drawn by 4-4-0 Locomotive No. 897.



Photo] [*F. E. Mackay.*

CALEDONIAN RAILWAY:

10 a.m. Glasgow–Euston express. 4–6–0 locomotive No. 907 (Schmidt superheater).

Railway Ports.

10.—GRANGEMOUTH DOCKS.

THE CALEDONIAN RAILWAY.

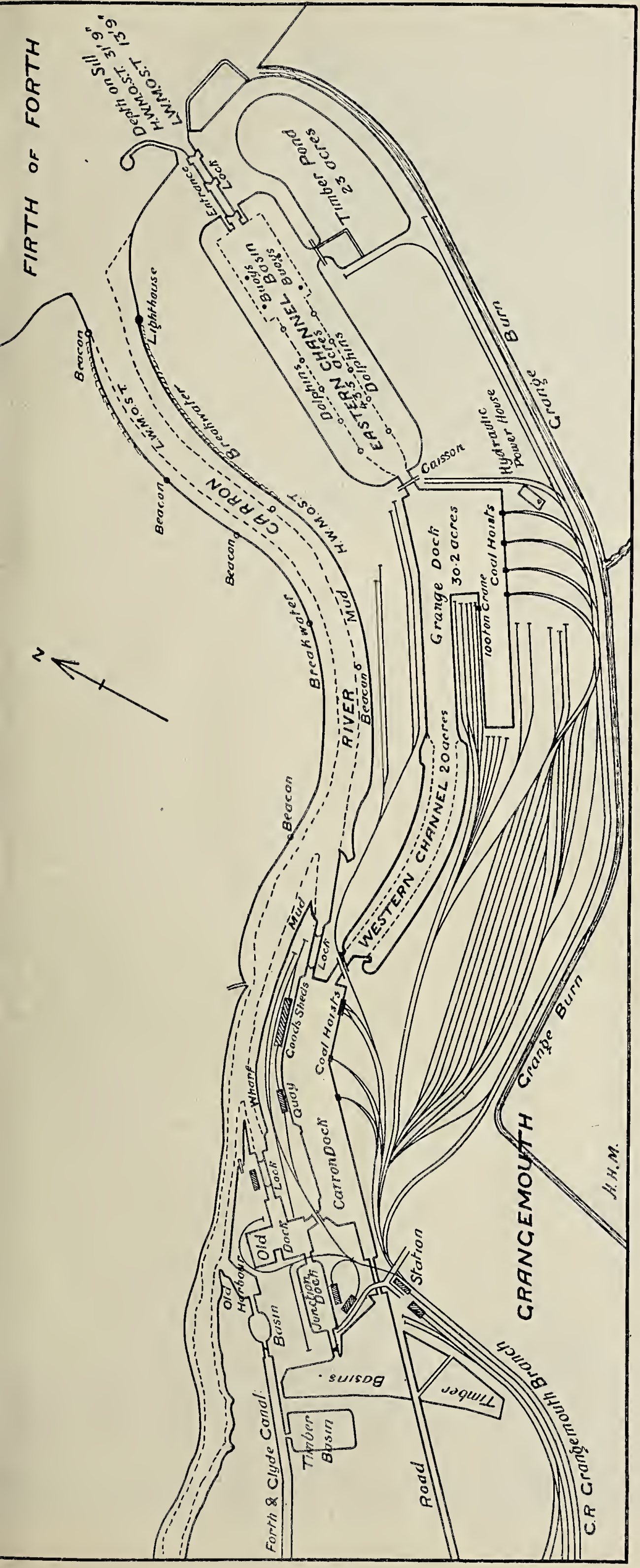
By TOM MOFFATT.

THE vast increase which in recent times has taken place in the shipment of coal from Scotland to the Baltic and North Europe, and also to Mediterranean ports, has necessitated an immense extension of the dock accommodation at the principal coal exporting centres. In no part of the kingdom has this development been more apparent than on the East Coast of Scotland, where, in the comparatively narrow compass of the Firth of Forth, and within a radius of about 25 miles, are found five ports with a total water area of 274 acres, the coal shipments from which last year (out of a total of nearly 16,000,000 tons for all Scotland) amounted to close on 10,000,000 tons.

Grangemouth, the largest of these, both in respect of its water area (165 acres) and of the annual tonnage inwards and outwards, now ranks as one of the most important of the Scottish coal shipping ports. Its geographical position is exceptionally favourable for dealing with a very large traffic, inasmuch as it is the nearest port on the east coast to Glasgow and the West of Scotland; it is in close proximity to the Lanarkshire, Stirlingshire and Slamannan coalfields, and within easy distance of the principal iron working and manufacturing districts of Scotland. Besides being served by both the North British and Caledonian Railways, it has the additional advantage of canal service. The Forth and Clyde Canal starts here, entering from the docks, as well as from the River Carron, and a large fleet of lighters and barges is always available to carry traffic to Port Dundas, Glasgow, and intermediate places, or through to the Firth of Clyde, passing out at Bowling, and thence to the West Coast and Ireland.

THE STEAMER "CARRON" AT CARRON DOCK.

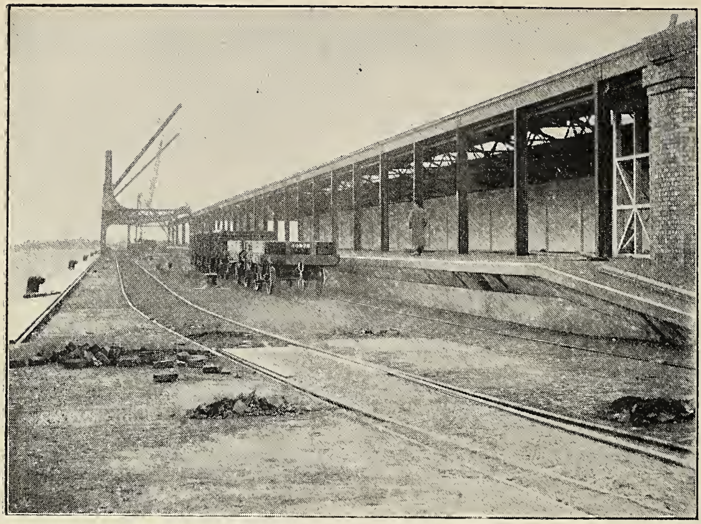
The history of the port of Grangemouth dates back to the year 1777. A harbour was then formed by Sir Lawrence Dundas for the shipping passing through the Forth and Clyde Canal. When the canal was completed and opened throughout for traffic in 1790, the port consisted of a small tidal harbour suitable only for small craft; and as showing its comparative insignificance at that time, it may be mentioned that up to the year 1810 all vessels owned in Grangemouth were



PLAN OF GRANGEMOUTH DOCKS.

registered at the neighbouring port of Bo'ness. In 1843 the first dock, now known as the "Old" Dock, was opened. This dock is 4½ acres in extent, 786 ft. long, 147,300 ft. wide, and has a quayage of 2,250 ft. The entrance is 55 ft. in width, and the maximum depth of water on the sill at ordinary spring tides is 23 ft. In 1854 an extension of the dock area was projected, and in 1859 the "Junction" Dock, 3¼ acres in extent, was constructed between the Old Dock and the Timber Pond.

In the early "sixties" the Caledonian Railway had been seeking an outlet on the East Coast of Scotland suitable for the shipment of the rapidly increasing output of the great coal and mineral districts of central Scotland, and the company eventually decided to take powers for the acquisition of the Port of Grangemouth, which was in the possession of the proprietors of the Forth and Clyde Navigation. That undertaking, in addition to the canal and the harbour referred to, then embraced the Grangemouth Branch Railway, the Drumpellier Railway, the Monkland Canal, and a portion of the harbour of Bowling on the Firth of Clyde, the western terminus of the Forth and Clyde Canal. In acquiring the harbour of Grangemouth, the railway had, therefore, also to take over the other works of the canal company, and for this they obtained the necessary powers under the Caledonian and Forth and Clyde Navigation Act of 1867. The accommodation of the port at the time of the transfer consisted of the Old and Junction Docks, with a water area of 7¾ acres,



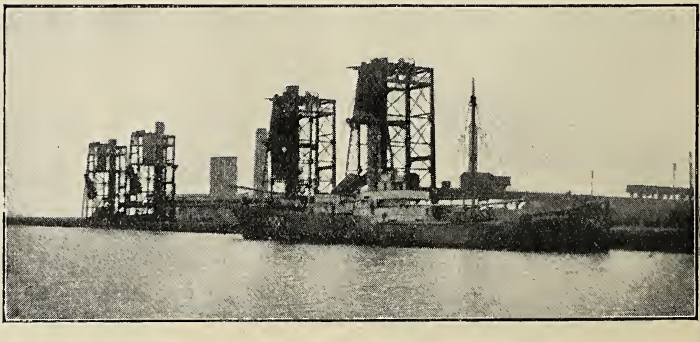
CARRON DOCK: PART OF THE CARRON COMPANY'S LOADING BERTH.

together with a large timber pond, and the annual tonnage dealt with amounted to about 460,000 tons.

In the case of nearly all the important ports which have been acquired by railways, the effect has been materially to stimulate and revive trade. This was especially apparent in the case of Grangemouth, where the traffic expanded to such an extent that 10 years after the transfer the tonnage dealt with had nearly doubled. A much larger class of vessel began to frequent the port, and by the year 1876 the traffic had altogether outgrown the accommodation. The railway then applied for, and in the year mentioned obtained, Parliamentary powers for the construction of a new dock, 20 acres in extent, and for the deepening of the River Carron to a depth of 25 ft. at high water of ordinary spring tides. This dock, known as the "Carron" Dock, was opened for traffic on June 3rd, 1882. It is 1,950 ft. in length, 405 ft. wide, and the quayage extends to 3,656 ft. The width of the entrance, through a lock 350 ft. long, is 55 ft., and the depth of water on the sill at high water is 24 ft.

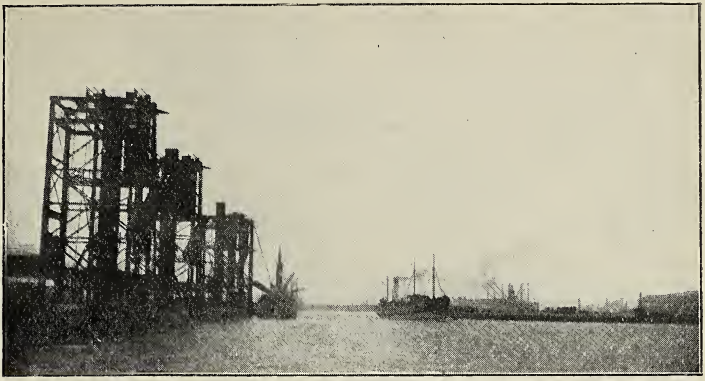
In the year 1882, when the Carron Dock was brought into use, the tonnage of the port amounted to 858,235 tons, and as the trade had expanded by leaps and bounds—by the year 1895 the tonnage totalled 2,287,211 tons—the dock accommodation again proved inadequate. The railway then set on foot a scheme for further extension of the dock area, and as there was every indication that the trade would in a very short time increase to considerably greater dimensions, the works taken in hand were planned in such a way that, besides satisfying the immediate requirements of the port, they would be easily adapted to any further extension which might be required. The scheme, which cost over a million sterling, consisted of a new dock of 30 acres, connected to the then existing docks by a western channel of 20 acres, and an eastern channel and canting basin with an area of 43 acres, having direct access to the Firth of Forth through a new entrance lock, and also a new timber basin of 23 acres. Powers for the acquisition of the necessary lands and for carrying out of the gigantic works were obtained under the Caledonian Railway Act, 1897.

The new dock, named the "Grange" Dock, took nearly eight years to build, and was opened for traffic on October 8th, 1906. It has a depth on the sill of 26 ft. at high water of ordinary spring tides, and is capable of accommodating the largest class of vessels visiting the port. The new entrance lock giving access to this dock is 626 ft. long and 80 ft. wide. It is divided by gates into two portions, 250 ft. and 376 ft. in



GRANGE DOCK: NEW COALING HOISTS.

length respectively, and where it enters the Firth of Forth there is an almost constant depth of 30 ft. The construction of this lock enabled the navigation and costly dredging of the River Carron for a distance of nearly two miles to be abandoned, as shipping now passes direct from the Firth of Forth into the Grange Dock, and thence through the western channel to the Carron Dock. From the last-named dock there is a passage leading into the Old Docks, which, in turn, are connected with the Forth and Clyde Canal. The total water area is 165 acres, and the quayage inside the docks is about 18,000 ft. in length.

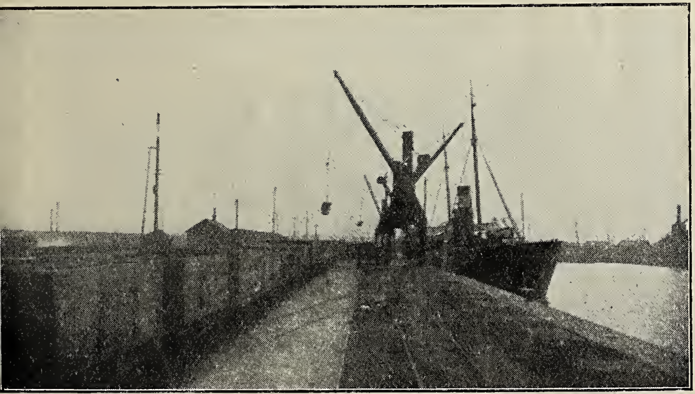


GRANGE DOCK, FROM THE N.E.

In equipment, Grangemouth Docks have the reputation of being among the finest and most up-to-date in the country. Costly modern hydraulic machinery, and other appliances are provided for the expeditious handling and delivery of traffic. Coupled with the fact that as the new sea locks give direct access to deep water late on the tide, vessels can enter and leave during a much longer period than at any of the other Forth harbours—namely, seven hours—these have placed the port in an exceptional position for dealing with the vast east coast export and import trade. There are in all eight hydraulic hoists, a hydraulic crane with a lifting capacity of 12 tons, and a 20-ton steam crane for the shipment of coal. Provision has been made for the erection of additional hoists when they become necessary.

In the Grange Dock there are four of the most modern hydraulic coaling hoists, with high level run-away rails for empty wagons designed for dealing with the larger class of trucks now being used by a large number of the railways for the heavier mineral traffic. These hoists can raise a load of 35 tons to a height of 45 and 50 ft. above rail level, and each is capable of shipping 50 wagons per hour. Two of the hoists, and two of those in the Carron Dock, may be moved so as to enable vessels to be loaded at two hatches simultaneously. The docks are also provided with a complete installation of movable hydraulic cranes for loading and unloading goods into and from railway wagons. Fitted round the quays there are in all 40 of these cranes, with a lifting capacity of from 30 cwt. to 12 tons. Not the least important of the dock appliances are the hydraulic capstans which have been fixed at convenient points to obviate the old-fashioned and unsatisfactory system of horse shunting of wagons on the quay side. The docks are lighted throughout by electricity, generated in a special power house, and this arrangement greatly facilitates the working of traffic when loading or unloading requires to be carried on during the night at the busier periods of the year.

But besides being one of the foremost of the coal-shipping ports of the country, Grangemouth carries on a very large and valuable general traffic, consisting of pit props, sawn timber, oil, iron ore, limestone and miscellaneous goods. The import trade in pit props and timber—for which



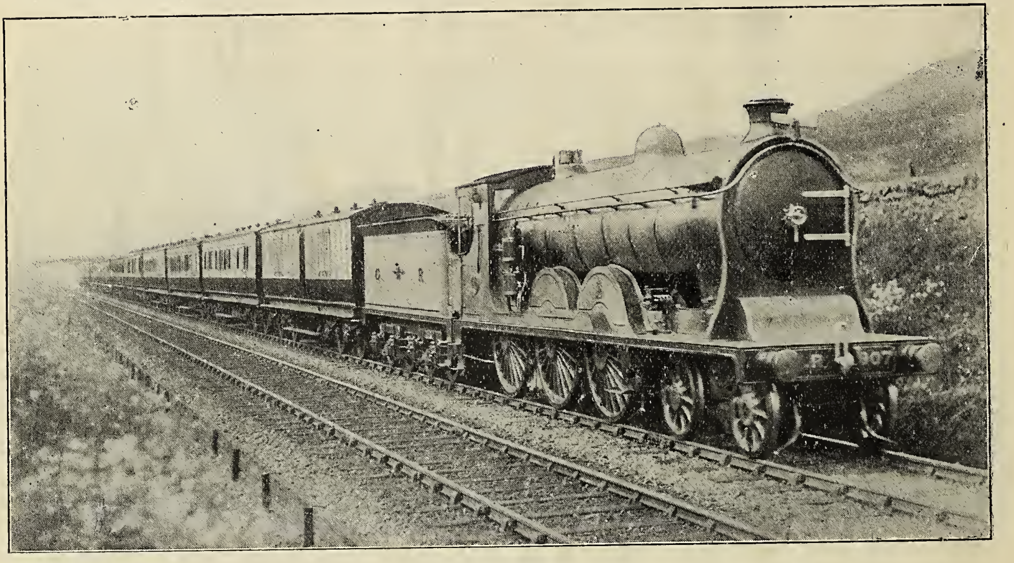
GRANGE DOCK STEAMER UNLOADING IRON ORE.

the port is now one of the most important in North Britain—is rapidly increasing, and extensive accommodation has been set aside for its further expansion. The timber ponds cover about 45 acres, and about 200 acres near the docks have been reserved for storage purposes. The handling of the timber is facilitated by the provision round the basins of rails which enable it to be lifted out of the water by means of hydraulic cranes and placed in the railway wagons alongside.

There is extensive berthage for the timber cargoes, which come mostly from Norway, Sweden, Russia and Germany, and the traffic, to a great extent, is unshipped by means of hydraulic cranes on the quayside and loaded direct into the railway wagons for transit inland. The oil trade of the port is rapidly increasing, and immense storage tanks have been established by the Anglo-American Oil Company, Ltd., for the import and storage of burning oils and petrol. These works are situate at the mouth of the harbour, where the tank steamers are berthed on their arrival from America. Only a short distance separates the steamers from the storage tanks, and the oil, whether petroleum or motor spirit, is pumped direct from the vessel into the tanks.

Works have also been established at the harbour by Messrs. James Ross & Company, of Falkirk, for the storage and export of creosote and oil fuels; and, in view of the greatly extended use which is now being made of oil fuels by the Admiralty, and the close proximity of the port to the new naval base at Rosyth, on the north side of the Firth of Forth, the prospects of the oil trade of Grangemouth are exceedingly bright.

The import iron ore traffic is dealt with mostly in the Grange Dock, where special berths have been set aside for the work. The ore, which comes from Bilbao and other places, is unloaded with the aid of hydraulic cranes direct from the holds of the vessels, and transferred into the railway wagons alongside, for conveyance to the great iron works. The facilities for dealing with general goods and merchandise are equally ample and complete. Spacious storage sheds, equipped with hydraulic cranes for the loading and unloading of goods into and from the railway wagons, have been erected round the docks. The traffic arrangements generally are such as to ensure the utmost dispatch in dealing with goods, and from every point of view the port of Grangemouth ranks among the finest and most up-to-date in Great Britain. Regular lines of steamers run to London, Hull, Middlesbrough, Hamburg, Christiania, Riga, Rotterdam, Antwerp, and elsewhere, the most important being that of the Carron Company, which is one of the oldest industrial concerns in the kingdom, having been founded as far back as 1759.



Photo] CALEDONIAN RAILWAY. [*Mr. H. G. Tidey.*

10 a.m. Glasgow-Euston express ascending Beattock Bank. 4-6-0 Engine, No. 907.

Grangemouth Docks Facilities.

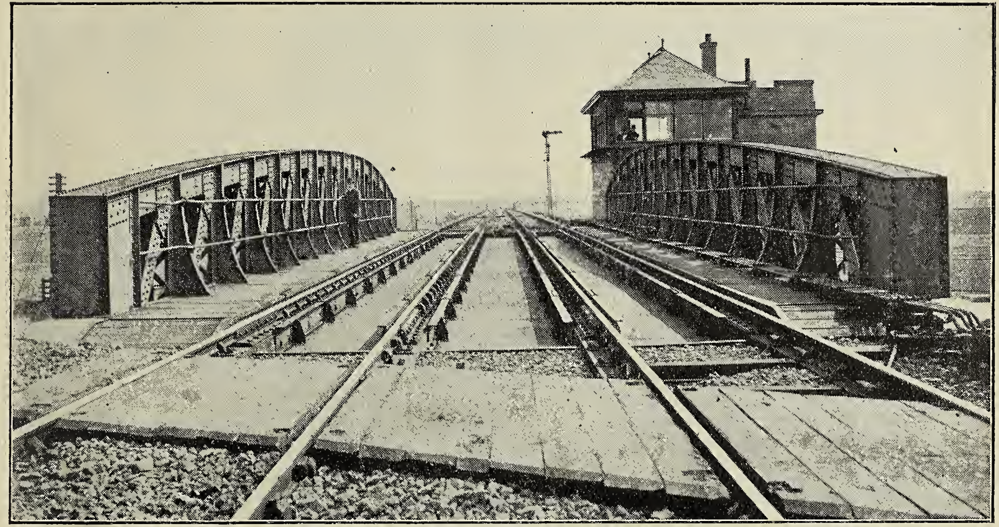
The Avoiding Lines at Grahamston.

CONSEQUENT upon the extensive additions made by the Caledonian Railway to its Grangemouth Docks, the traffic to and from them increased so rapidly in the years just prior to the War, that it became necessary to provide additional accommodation to deal with this traffic.

The railway at Grahamston station is very busy, due to the fact that the trains of the Caledonian and North British Railways pass through that station, and also that there is always considerable shunting necessary in the vicinity. The junction between the North British Railway to Edinburgh *via* Polmont, and the Caledonian Railway's line to Grangemouth is situate at a distance of about a quarter mile west of Grahamston station.

It was therefore decided to construct a new line that would enable traffic to and from Grangemouth to avoid Grahamston station, and a railway from Sunnyside to Fouldubs, as shown on the map on page 98, was decided upon.

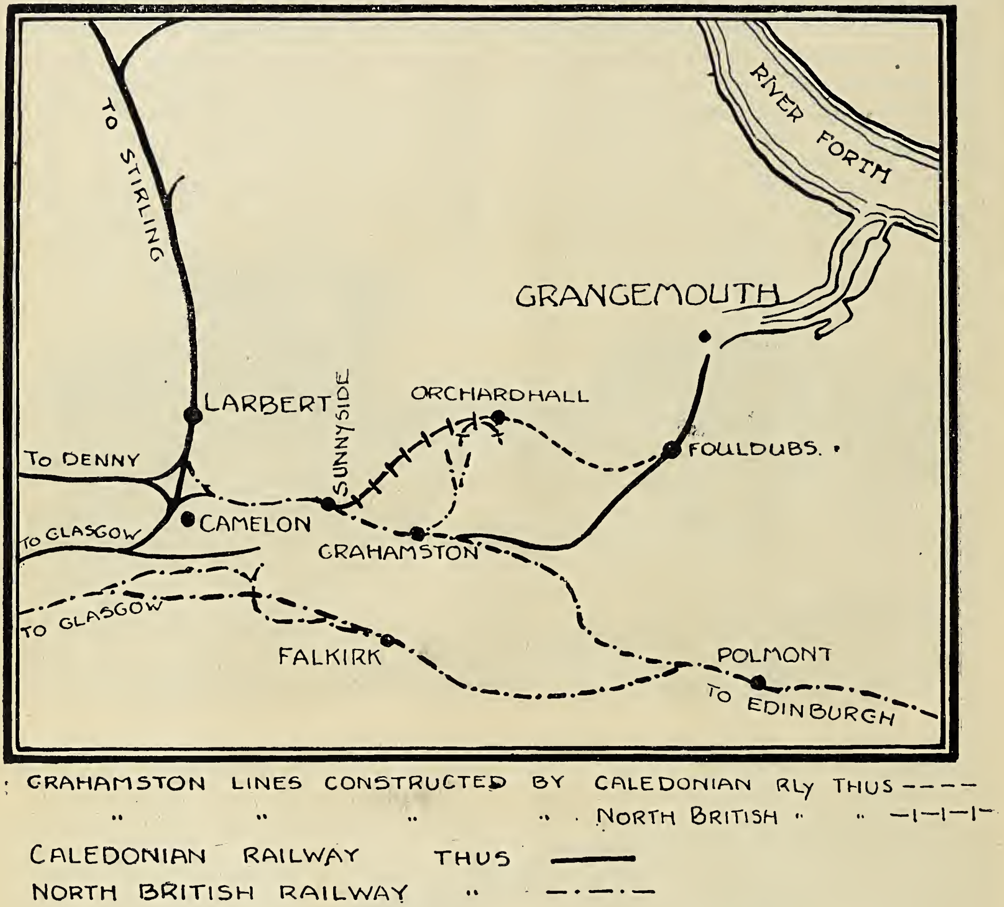
The new line commences by a junction with the existing main line between Camelon and Grahamston stations, and after proceeding in an easterly direction through Bainsford and across the Forth and Clyde Canal near Dalderse, terminates by a junction with the main passenger line to Grangemouth at Fouldubs, which is about one and a quarter miles south of Grangemouth station. It was opened for goods and mineral traffic on 23rd October, 1911. Up to the outbreak of the War, passenger traffic had not been worked over it, and as the conditions obtaining during the War and since have precluded any increase of passenger train services, no arrangements have yet been made for passenger trains to make use of the new line.



THE SWING BRIDGE ACROSS THE CANAL IN POSITION FOR TRAINS TO PASS OVER.

The new railway has been treated as a joint Caledonian and North British Railway. The portion extending from the junction at Sunnyside to Orchardhall was constructed by the North British Railway, while the remaining portion extending from Orchardhall to the junction at Fouldubs was constructed by the Caledonian Railway. The works on the North British Railway section were carried out to the design and under the direction of Messrs. Blyth and Westland, M.M.Inst.C.E., Edinburgh, while the works on the Caledonian Railway section were carried out to the design and under the direction of Mr. Donald A. Matheson, M.Inst.C.E., who was formerly Engineer-in-Chief, but is now General Manager for that Company, and the Resident Engineer was Mr. R. W. Gairns, Assoc.M.Inst.C.E.

The length of the portion constructed by the North British Railway is about one mile 44 chains, and the length constructed by the Caledonian Railway is one mile 32 chains, so that the total length of the new railway is 2 miles, 76 chains.


TO STIRLING
RIVER FORTH
GRANGEMOUTH
LARBERT
SUNNYSIDE
ORCHARDHALL
FOULDUBS.
TO DENNY
CAMELON
TO GLASGOW
GRAHAMSTON
TO GLASGOW
FALKIRK
POLMONT
TO EDINBURGH
GRAHAMSTON LINES CONSTRUCTED BY CALEDONIAN RLy THUS - - - -
" " " " NORTH BRITISH " " —I—I—I—
CALEDONIAN RAILWAY THUS ———
NORTH BRITISH RAILWAY " —·—·—

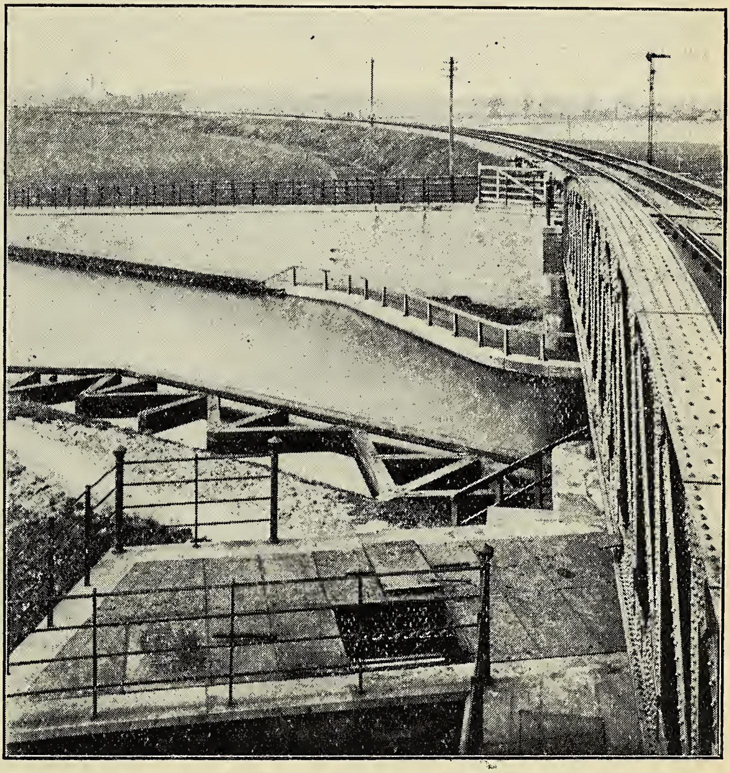
On the Caledonian Railway section of the line there are six bridges, three over the railway and three under the railway, one of the latter being a swing bridge over the Forth and Clyde Canal. On the North British Railway section there was an excess of cutting over embanking, while on the Caledonian Railway section there was an excess of embanking over cutting. In view of this fact and in order to avoid any complications which might arise in regard to the disposal of the surplus excavated material, the construction both of the North British Railway section and the Caledonian Railway section were given to one firm of contractors, namely, Messrs. Robert McAlpine and Sons, Glasgow.

In connection with the bridges on the Caledonian Railway section, the foundations required special treatment on account of the soft nature of the strata, which for the most part consisted of alluvial deposit and mud. The bridges under the railway are built for two lines of way, while in view of the ultimate considerable development of the traffic using the new line, all the bridges over the railway are constructed for four lines of way. Only two lines of permanent way have been laid up to the present, but the necessary land for four lines of way throughout has, however, been taken.

The most important bridge on the Caledonian Railway section is the swing bridge carrying the railway over the Forth and Clyde Canal. The foundations and walls of this bridge were constructed by working inside timber cofferdams, and in order to ensure that there would be no subsidence when the load came on to the structures, timber piles forty feet long were driven over the area of the foundations at three feet centres, and their heads enveloped in the concrete foundations. The railway crosses the canal at an angle of 61 degs. 7 mins.; the width of the canal on each side of the railway crossing is about 60 feet. The minimum fairway of the canal at the crossing of the railway is 25 feet.

The superstructure of the swing bridge consists of two main girders with cross girders, longitudinal rail bearers and steel decking. The main girders are of the Linville truss type, and are hog-backed in shape. They are each 105 ft. 5 ins. in length, the depth at each end being eight feet, while over the pivot or main lifting ram, which is placed at about one-third of the length of the main girder from the back end, thus giving a leverage of two to one, the depth is twelve feet. The main girders are two feet wide over the flanges and are placed at 28 ft. 6 ins. centres. The top and bottom booms are box shaped, and are built up of vertical web plates and angles. The web members were all designed as struts, and are each thirteen inches wide, made up of T bars and plates. The cross girders are 2 ft. 3 ins. deep, with the exception of those at the pivot or main lifting ram, which are deeper and much heavier in section, and also those at the back end of the bridge, which are slightly less in depth, but are much stronger in section. The cross girders at the back end of the bridge are of box section, and are filled with cast iron kentledge blocks. The weight of the bridge when swinging is transferred to the centre pivot by a specially heavy cross box girder, which is bolted to the knuckle of the centre pivot.

On each side of the bridge there is a footpath 4 ft. 6 ins. wide, and one side of this, which is carried by the longitudinal rail bearer, acts also as a wheel guard. In addition to the kentledge blocks placed in and between the cross girders towards the back end of the bridge, the spaces at the back end of each main girder are also filled with kentledge blocks.



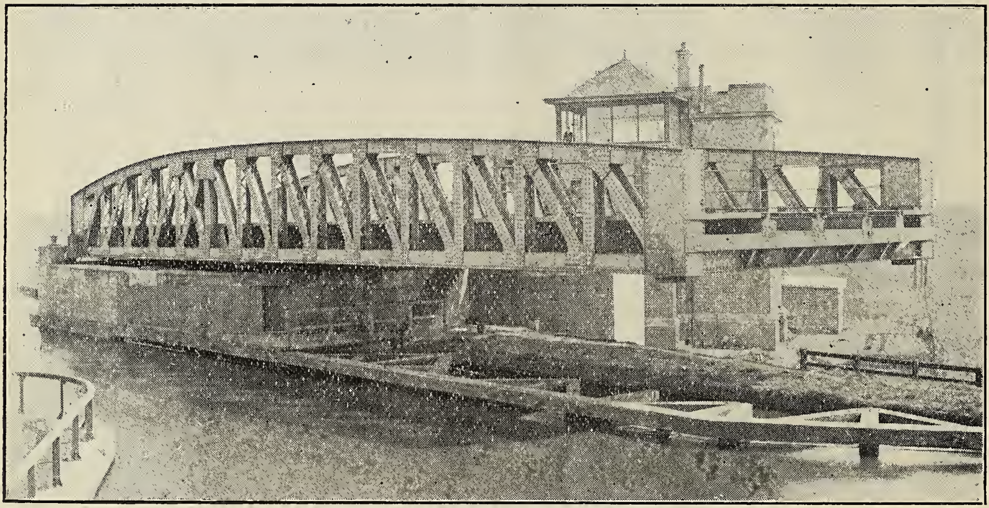
THE SWING BRIDGE AND RAILWAY BEYOND, AS SEEN FROM THE BRIDGE SIGNAL CABIN.

The bridge is operated by hydraulic power supplied by two three-throw pumps worked by two electric motors, the pumps and motors being duplicated in case of failure of one of the systems. The force pumps are $2\frac{1}{2}$ ins. diameter, 4 ins. stroke, and the motors, which are 13 h.p. working at five hundred revolutions per minute, are supplied with direct current obtained from the Falkirk Burgh Electricity Works. These force pumps raise the accumulator a maximum height of sixteen feet. The ram of the accumulator is fourteen inches diameter, and the pressure obtained from the accumulator is 750 lbs. per square inch. In the event of failure of the electric driven pumps, a hand pump, $1\frac{1}{4}$ ins. diameter, is provided for pumping up the accumulator.

The plan in force for opening the bridge and for protecting the railway whilst so open, is as follows:—

On obtaining permission from the adjacent signal boxes at Bainsford and Fouldubs to open the bridge, the first operation of the signalman at the swing bridge box is to release the mechanical lock at the rear end of the bridge. The signalman next raises the bridge on the centre press by means of the hydraulic power, and when it is raised to the extent of two and a half inches the water is cut off automatically. When the bridge is raised two and a half inches at the centre press, the nose end of the bridge is seven inches clear of its bearing, due to the counterweight or preponderance of six tons at the tail end of the bridge. The hydraulic pressure is then admitted to the turning cylinders, which are provided in duplicate. One pair of these cylinders is capable of opening and closing the bridge. The bridge is turned by means of chains attached between the turning cylinders and a drum fixed on to the underside of the bridge at the pivot. The chains are fastened on opposite sides of the drum.

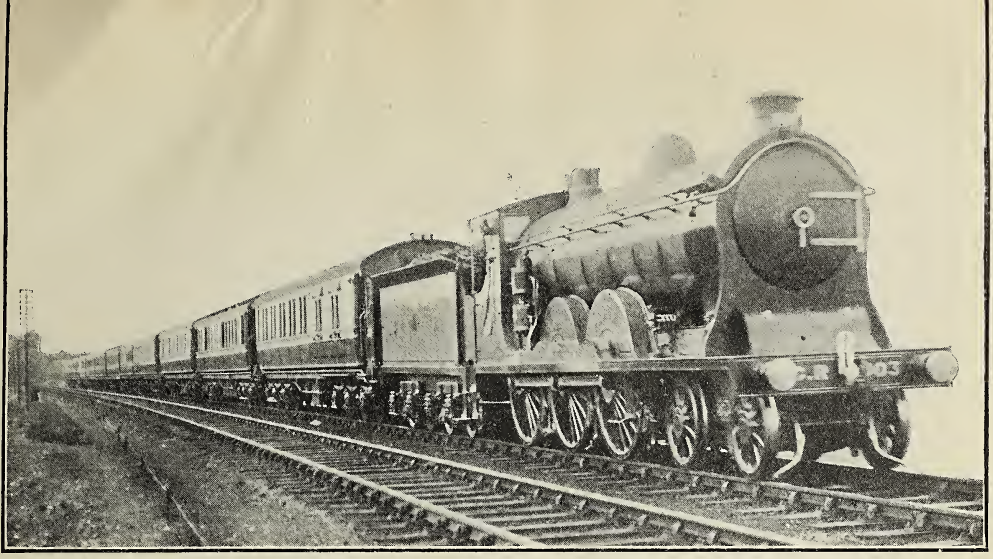
To open the bridge, water is admitted into one of the turning cylinders, which has the effect of pushing out the ram and pulling the drum round. The fellow chain on the other side of the drum drives the ram of the other cylinder round and exhausts the water in that cylinder.



THE BRIDGE ACROSS CANAL, OPEN TO ALLOW BOATS TO PASS.

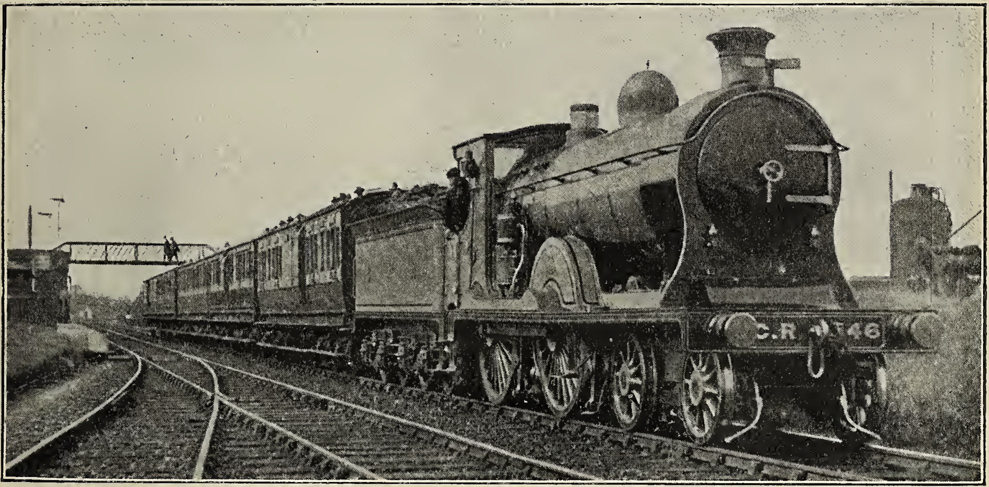
The chains for the duplicate set of turning cylinders are attached to the same turning drum, one above the other, and while water is admitted into one set of cylinders for swinging the bridge, the rams of the duplicate pair of cylinders are opening or closing as the case may be.

In order to close the bridge, the order of the operations is reversed. The water is admitted into the empty turning cylinder and this opens the exhaust of its fellow cylinder, and allows the bridge to be swung back to its closed position. The pressure on the centre pivot is next removed, and the bridge settles on to its



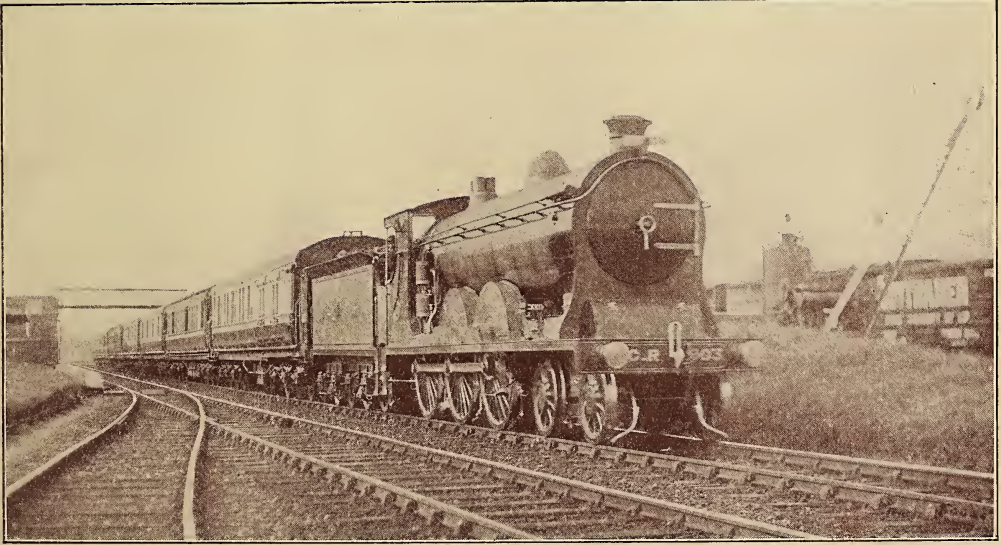
Photo] CALEDONIAN RAILWAY. [*Mr. H. Gordon Tidey.*

2 p.m. Glasgow–Euston Express approaching Port Carlisle Junction, hauled by 4–6–0 Locomotive No. 903.



Photo] CALEDONIAN RAILWAY. [*Mr. H. Gordon Tidey.*

Glasgow-Carlisle Train passing Gretna, 4–4–0 Locomotive No. 146.

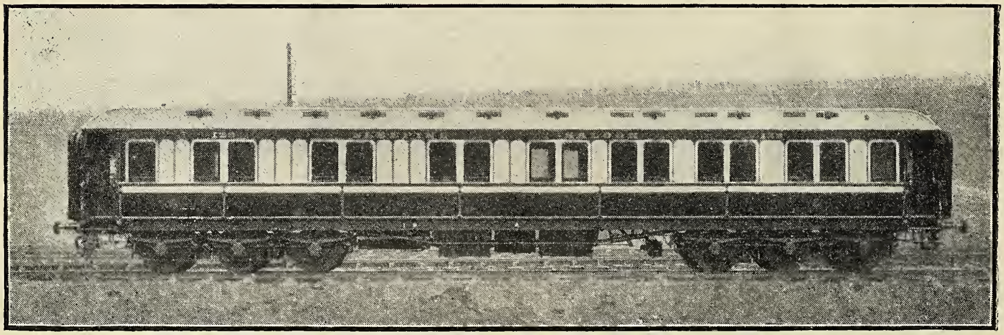


Photo] CALEDONIAN RAILWAY. [*Mr. H. Gordon Tidey.*

2 p.m. Glasgow–Euston Express passing Gretna; 4–6–0 Locomotive, *Cardean*, No. 903.

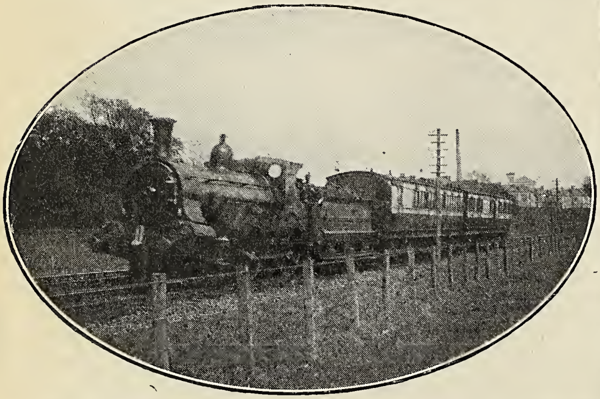
No. IX.—CALEDONIAN RAILWAY.

The Caledonian stands alone among British railways as to its gradients.



TWELVE-WHEELED SLEEPING SALOON: WEST COAST JOINT STOCK.

With a main line of 240 miles—longer than those of the North-Eastern or the Great Northern, and barely sixty shorter than that of its great English partner—it has an almost continuously hard road from end to end, rising at one spot to a thousand feet summit. The chief branches—as those into Glasgow and Edinburgh, and the cross-country lines (such as those between the two last-named cities) are equally hard; yet over all these hilly regions a high-class express service is maintained. Indeed, one could hardly guess from the time-tables, except perhaps by the timing of up trains going south below



Photo] CALEDONIAN RAILWAY. [*Mr. Tom M. L. Neish.*

2.45 p.m. Dundee West-Glasgow Express;
2-4-0 Locomotive No. 1588.

Stirling, that there were any banks to be surmounted at all.

It is true that the " Waverley " section of the North British is certainly harder, as a whole, than any like length on the Caledonian, while nowhere on the " Caly " main line are any grades nearly so steep as the South Devon inclines of the Great Western; but the latter are comparatively short, and on the " Waverley " the booked speeds are relatively low.

Also, light trains are seldom seen on the Caledonian Railway, while loads of 250 to as much as 350 tons are everywhere hauled—except on the one terrible incline at Beattock—by one engine, while high express speeds (56 or so an hour) are made on sections like the Stirling-Perth one with a climb at 1 in 80 on the way. The first thirty-five miles out from Carlisle are commonly spoken of as if they were practically level, but even in this relatively easy stretch there are twelve uphill miles at 1 in 200, in pieces of seven and four miles respectively, while the total rise from the 7th mile-post to the 22nd one, about 2 miles beyond Ecclefechan is about 290ft.

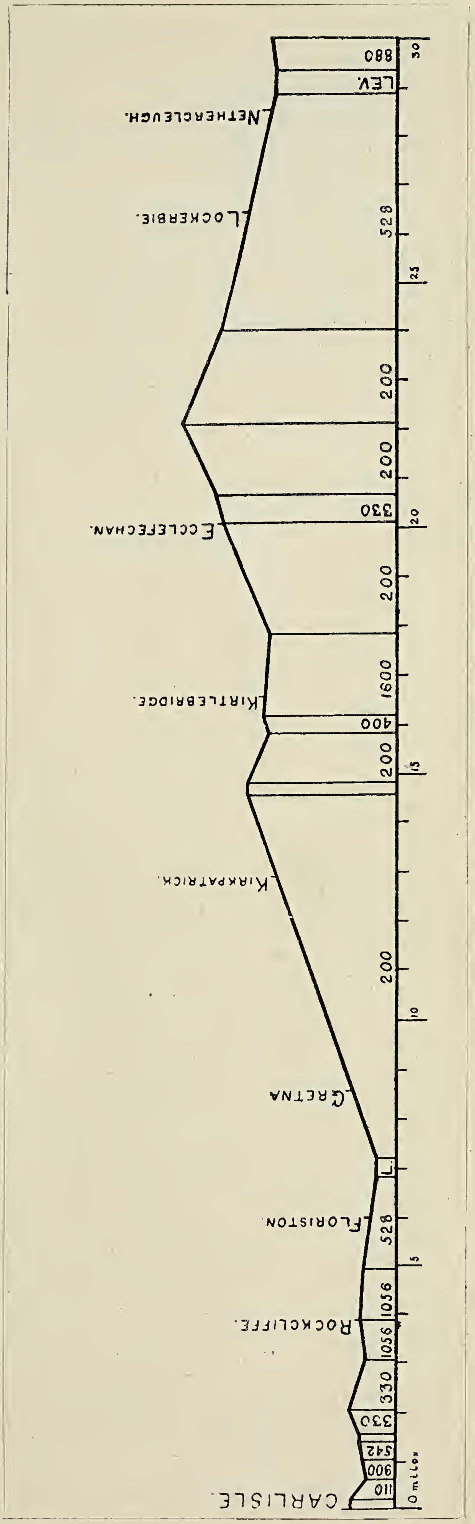
It may fairly be said that, looking at the speed and weight of the trains on the Caledonian line, this railway stands first in the hardness of its gradients and general difficulty of the road in actual working; that these difficulties are met and overcome is due to the skill and pluck of its Locomotive Department.

I. Main Line (Carlisle-Aberdeen).

(a) *Carlisle to Carstairs.*

The first seven miles out of Carlisle are easy, being nearly level with a downward inclination. Starting from Citadel Station there is a sharp fall (at varying grades) for the first half mile, followed by a rise—largely at 330 to the 2nd mile-post, with 1 mile of fall, also at 330. The next 4 miles are slightly downhill, the last two at 528.

After the seventh mile begins the Gretna bank, an unbroken rise at 1 in 200 (by Gretna and Kirkpatrick) for 7½ miles. From the summit, 1½ miles north of the latter station, is a downhill

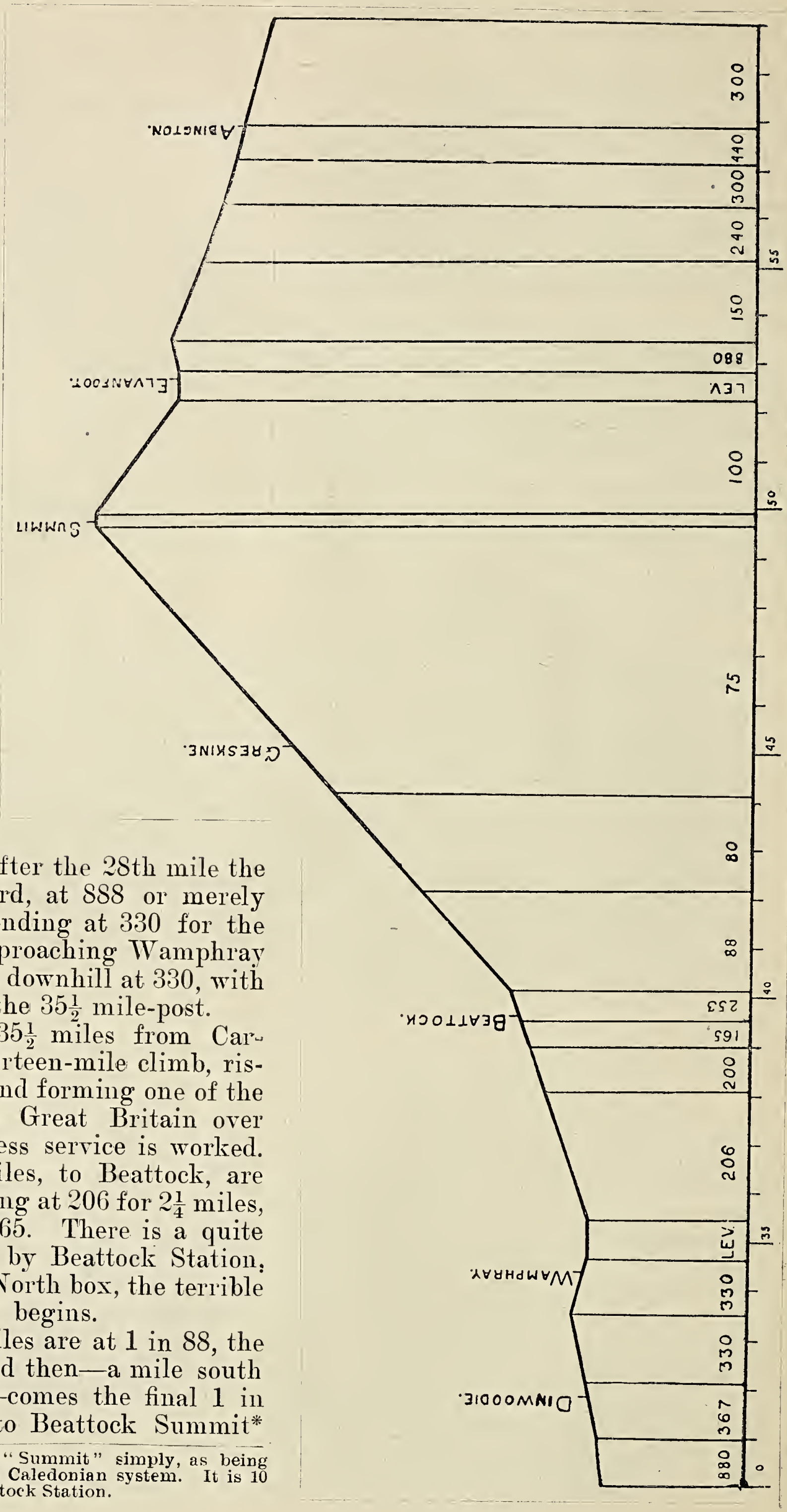


GRADIENT PROFILE, CALEDONIAN RAILWAY MAIN LINE.

bit for nearly three miles, beginning at 200, with a momentary rise at 400 at the 16th mile, but then falling again at nominal grade (1,600). From near the 18th mile-post is a four-mile uphill stretch at 1 in 200, to the summit 2 miles beyond Ecclefechan Station. From this summit (310 ft. above datum) follows another easy stretch for 13 miles; the first seven to just beyond Nethercleugh, are downhill, being at 200 for two miles, but the rest at 528. After the 28th mile the tendency is upward, at 888 or merely nominal grades, ending at 330 for the last 1½ mile. Approaching Wamphray Station it is again downhill at 330, with a level ½ mile to the 35½ mile-post.

At this point (35½ miles from Carlisle) begins a fourteen-mile climb, rising 770ft. in all, and forming one of the hardest banks in Great Britain over which a fast express service is worked. The first four miles, to Beattock, are relatively easy, being at 206 for 2¼ miles, then at 200 and 165. There is a quite short bit at 253 by Beattock Station, and then—at the North box, the terrible "Beattock Bank" begins.

The first two miles are at 1 in 88, the next two at 80, and then—a mile south of Ereskine box—comes the final 1 in 75 for 5¾ miles, to Beattock Summit*



CALEDONIAN RAILWAY MAIN LINE, CARLISLE TO THE NORTH—(*Continued*).

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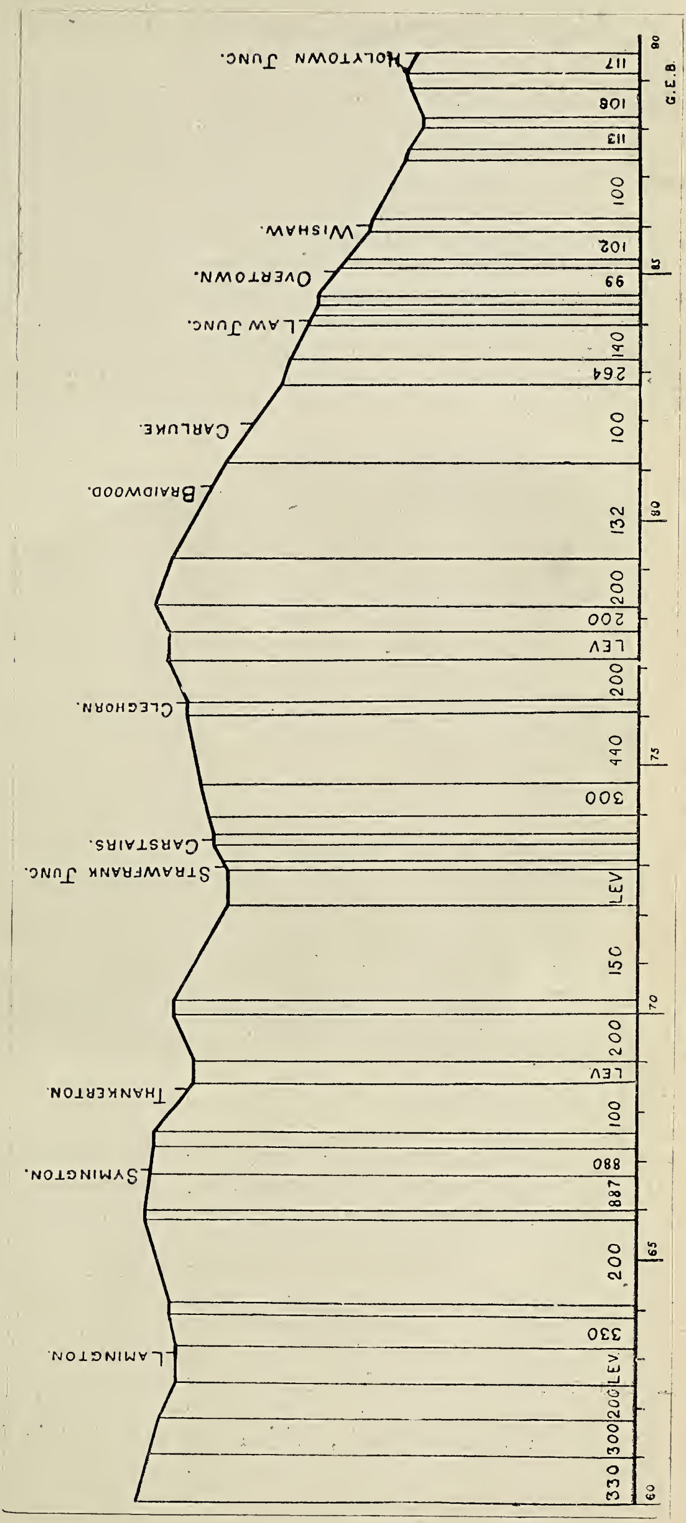
* Officially known as "Summit" simply, as being the summit-level of the Caledonian system. It is 10 miles 1 chain from Beattock Station.

1,015ft. above datum, and a rise of only 30ft. less than that from the 7th mile out from Carlisle. It should be noted that unlike most long inclines, there is not the slightest break in the rise for the ten—in fact, for the whole fourteen—miles.

At "Summit" there is a tiny strip of level, and then the trend is downwards right away to Stirling, more than sixty-eight miles. There are, however, many upward breaks, some at fairly steep grades, while the numerous service-slacks make the course by no means so favourable a one for down trains in actual running as it looks on the "profile." For up trains it is, of course, a very heavy stretch of great length.

From the summit to Elvanfoot is a sharp fall for over 2 miles at 100, making a bad finish for up trains that have started from Carstairs or Strawfrank. After a mile of level and slight rise at Elvanfoot, the fall continues for nearly ten miles to Lamington; it begins at 150, but eases to 240 and 300; from Abington the remaining 5 miles are mostly at the latter grades, easing off to level on the last $\frac{3}{4}$ mile. At Lamington a moderate rise for some 3 miles, at 330 to 200, and then a 'table-land' on either side of Symington.

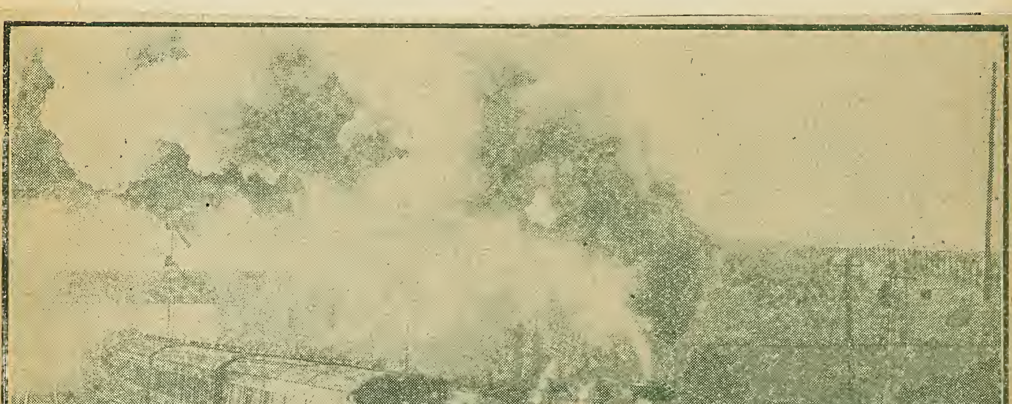
(*To be continued.*)



GRADIENT PROFILE, CARLISLE TO THE NORTH—(*Continued*).

Photo.] [*Mr. Tom M. L. Neish.*

11.15 P.M. *ex*-EUSTON-ABERDEEN EXPRESS PASSING ARDLER. 4–6–0 LOCOMOTIVE NO. 904.



THE "GRAMPIAN EXPRESS" OF THE CALEDONIAN RAILWAY, PASSING ROBROYSTON.
This was the most famous train in North Britain in pre-war times.

April 19

The Gradients of our Chief Railways.

No. IX.—Caledonian Railway.—*Continued.*

By W. J. Scott, B.A.

(b) *Carstairs to Stirling and Perth.*

THE bank, which really begins at Strawfrank Box, continues from Carstairs Station for about six miles, to a summit a little beyond the 78th milepost. There is nothing steep in this rise; much of the first part being at 440 (to Cleghorn), the last part, however, is mostly at 200, with a level ½ mile. Then follows at once from the same summit the Law (or Wishaw) bank a ten-mile fall, much of it at 100. To Braidwood it is mostly at 1 in 132; then follow two miles at 100 (either side of Carluke) easing off to 264 and 140 to Law Junction.[*] In the remaining four miles the grade changes continually, and there are small strips of level; at Overtown there is nearly a mile at 1 in 90—from Wishaw to the bank-foot 100 is again the prevailing gradient. At the 88th mile the bank ends—or rather is broken by a 1½ mile of uphill at 106 for—before Holytown the fall begins again, at grades varying from 116 to 93, 86, and—a quite short bit—77, to Mossend. [Here the Motherwell loop comes back again on to the main line; the gradients—for trains to Perth, etc.—by the latter do not differ much from those by Holytown].

From just before Mossend come 2½ miles of actual or virtual level, followed by three of moderate rise (almost level in the middle); from Glenboig Station to the summit the last ¾ mile is uphill at 161. Thence there is a downward mile at about 198, and then 2½ miles of rise to Cumbernauld, beginning at a slight slope, but steepening to 99 at the end. From this point there is a 12-mile downhill stretch, sometimes called the Greenhill bank, which makes another heavy pull for up trains. From Cumbernauld the fall is at 128 for 2½ miles, with two more at 132 to 100, with a strip of level in between; then the bank is broken by a rising mile, mostly at 660, and a short bit of level at Greenhill. Thence to Larbert the fall continues for 3 miles at 103 to 280; after another short break of level and rise at 253, the bank continues downhill at 164, etc., to its foot at Alloa Branch Junction.

At the same point begins a sharp rise at 126 for nearly two miles, to the Plean Branch Junction summit; thence to Stirling and Bridge of Allan is an almost continuous downhill for seven miles. The first 2½ fall sharply at 127, 118, etc., the next two are all but level to Stirling Station, with a moderate downward slope thence to Bridge of Allan.

In this section (Beattock Summit to Stirling) there are service slacks at Carstairs, Law, Holytown, and Larbert Stations, the Carstairs one extending from Strawfrank Box to beyond the north end of the station, so that it is exceptionally severe; there are also slowings for the many curves and facing-point junctions about Garlsherrie and Glenboig.

At Bridge of Allan the Kinbuck bank begins, a stiff climb for 5 miles, mostly at 100 to 88, though easier in places and also as steep as 78 at one point (the average grade is about 1 in 88). After two level miles—nominally falling at 7,511 [!]—the rise continues mostly at quite easy grades, though the 2 miles before Blackford are at 163, to Crieff Junction. These ten miles from Kinbuck, though in themselves easy, make the whole rise from Bridge of Allan a heavy one. The same summit (Crieff Junction) is the apex of the Auchterarder or Dunning bank. This falls (going north) mostly at 100 to beyond Auchterarder, and then at 121 to Dunning, seven miles in all.

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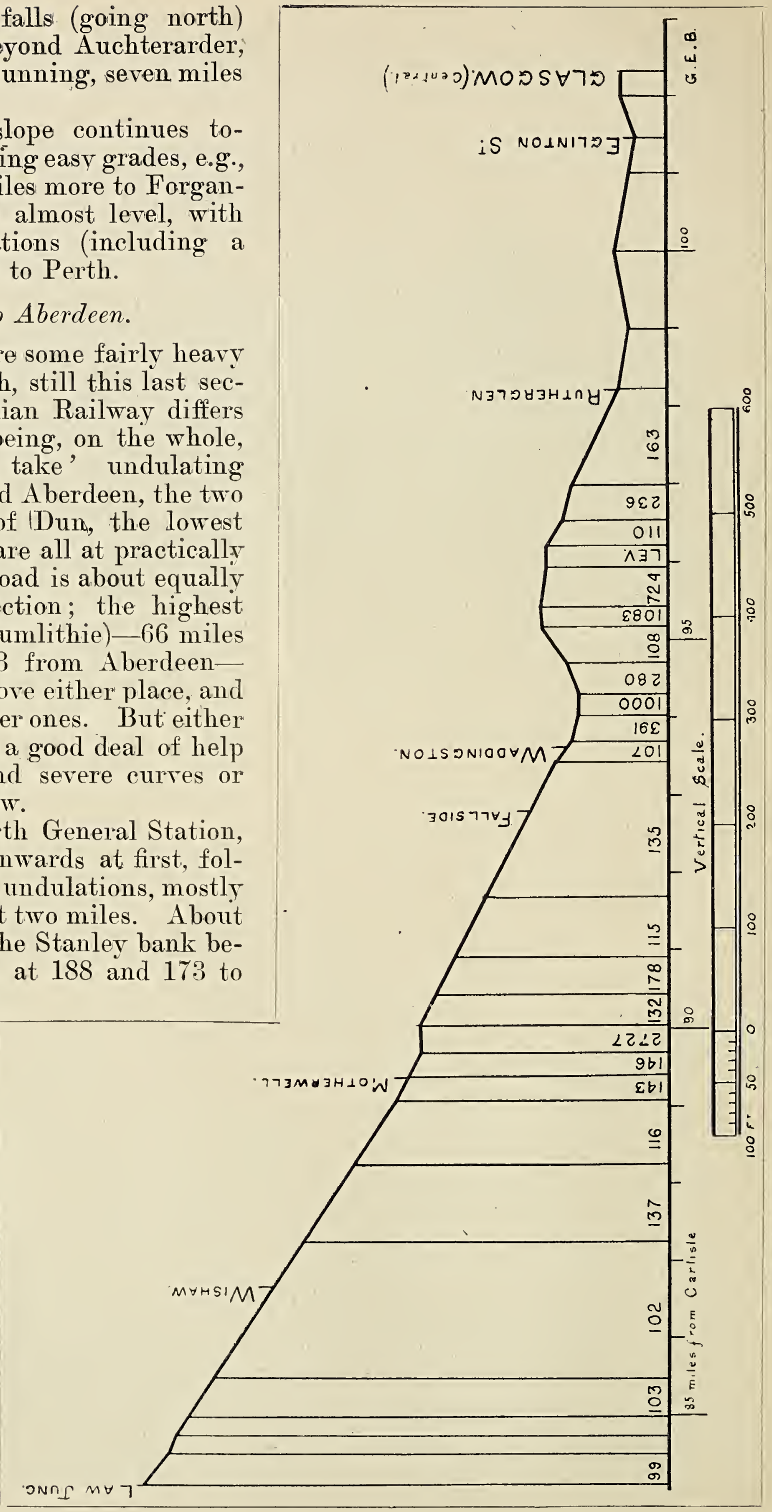
[*] The 'profile' follows the more direct main line, which is 45 chains shorter than by the Motherwell loop. The gradients, Law Junction to Motherwell, are given in the Glasgow line 'profile.'

The downward slope continues towards Perth, at varying easy grades, e.g., 436, etc., for five miles more to Forgandenny. Thence is almost level, with some short undulations (including a downhill bit at 150) to Perth.

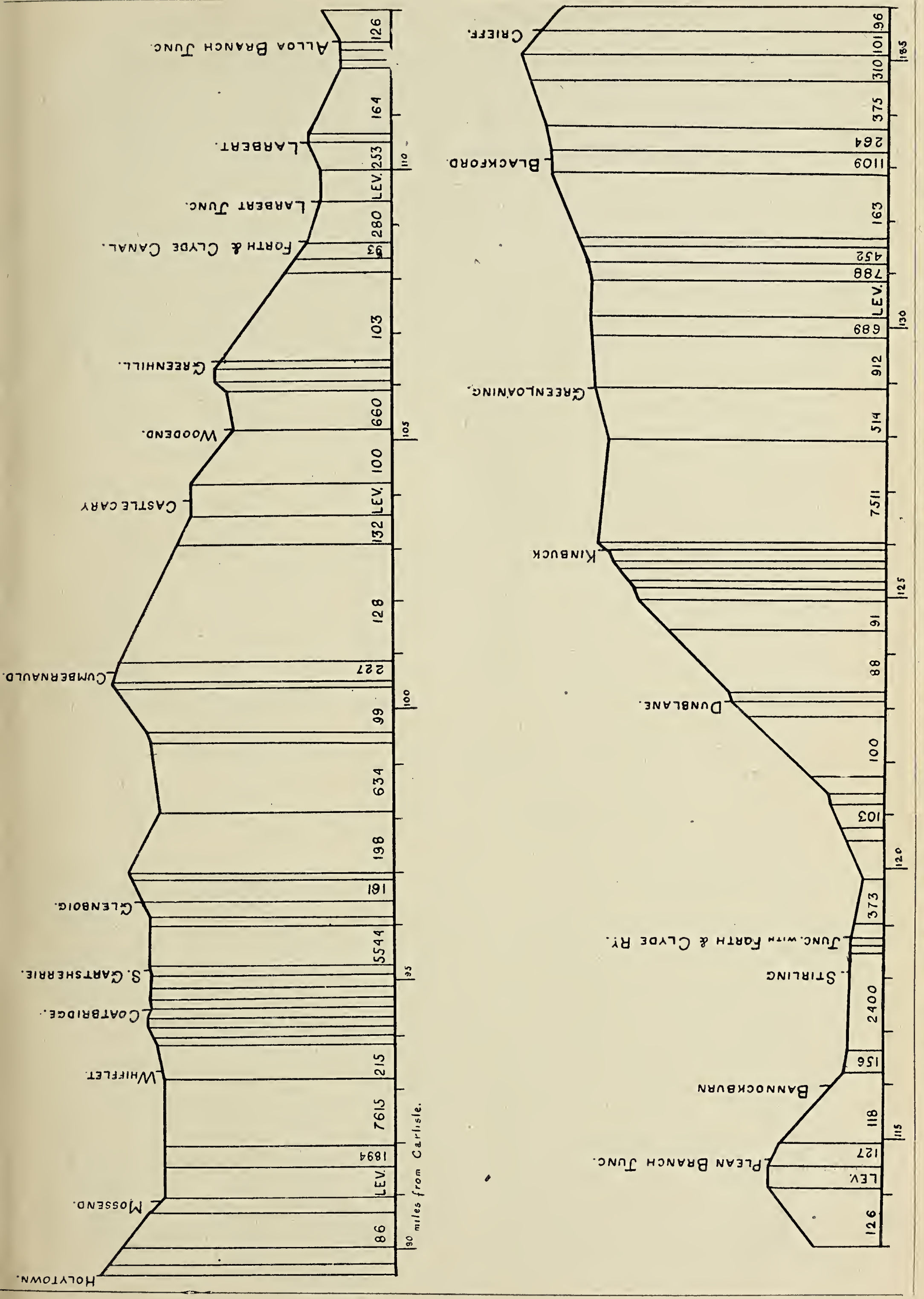
(c) *Perth to Aberdeen.*

Although there are some fairly heavy banks north of Perth, still this last section of the Caledonian Railway differs from the others in being, on the whole, a fair 'give and take' undulating course. As Perth and Aberdeen, the two ends, and Bridge of Dun, the lowest intermediate point, are all at practically the same level, the road is about equally hard in either direction; the highest summit (beyond Drumlithie)—66 miles from Perth and 23 from Aberdeen—rises about 330ft. above either place, and there are several lesser ones. But either way the engines get a good deal of help from gravitation, and severe curves or station-slacks are few.

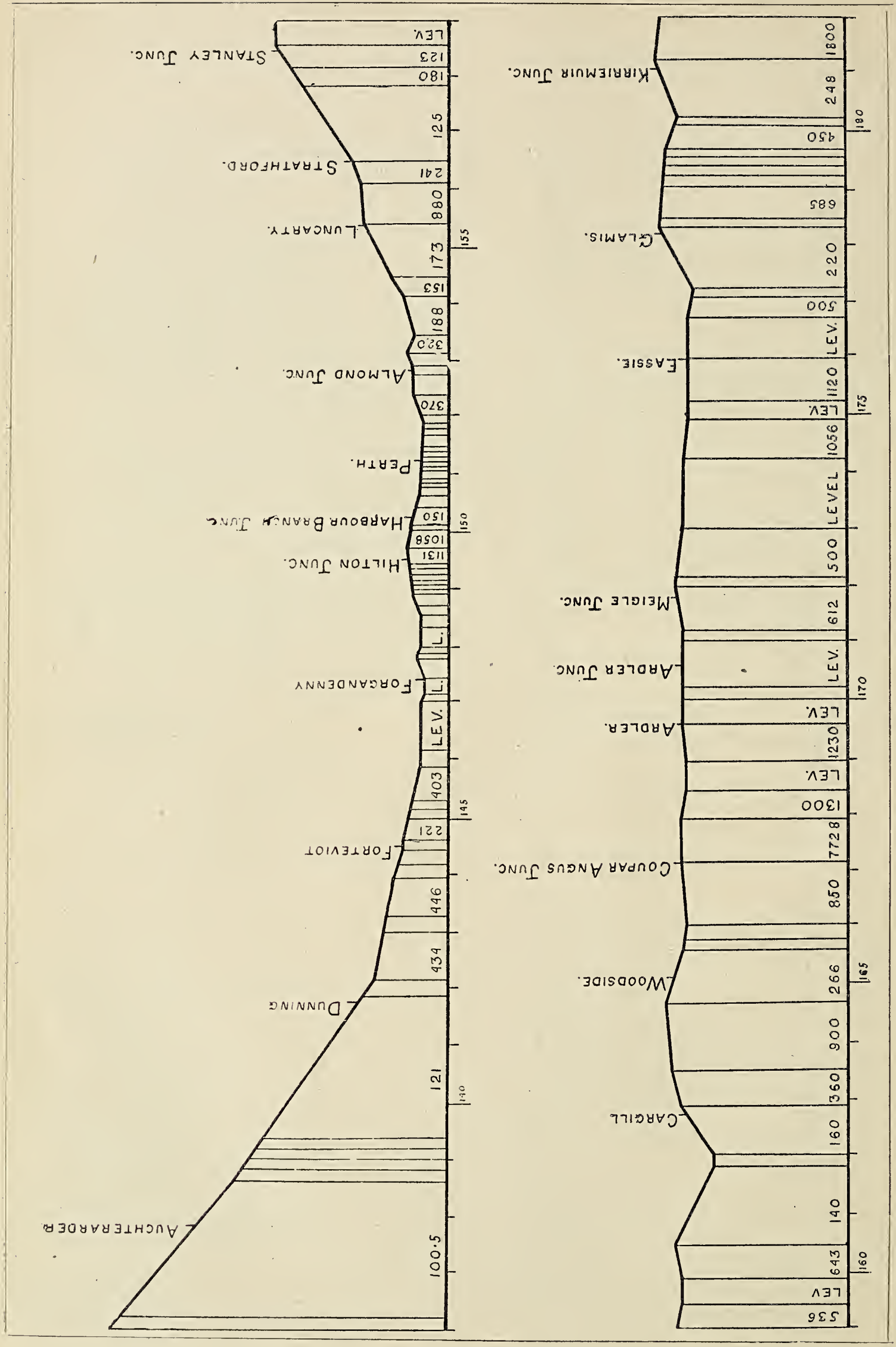
Starting from Perth General Station, the tendency is downwards at first, followed by some slight undulations, mostly upwards, for the first two miles. About the 153½ mile-post the Stanley bank begins; a 5-mile rise, at 188 and 173 to Luncarty, easing thence to Strathford, but then steepening to 125 and 123 to the summit at Stanley Junction. From Stanley to Forfar is a prolonged tableland for twenty-six miles, sloping slightly upwards towards the latter place. There is a sharp indentation about the 161st mile, with a fall at 140



GRADIENT PROFILE OF CALEDONIAN RAILWAY FROM LAW JUNCTION TO GLASGOW (CENTRAL), SEE PAGE 344.

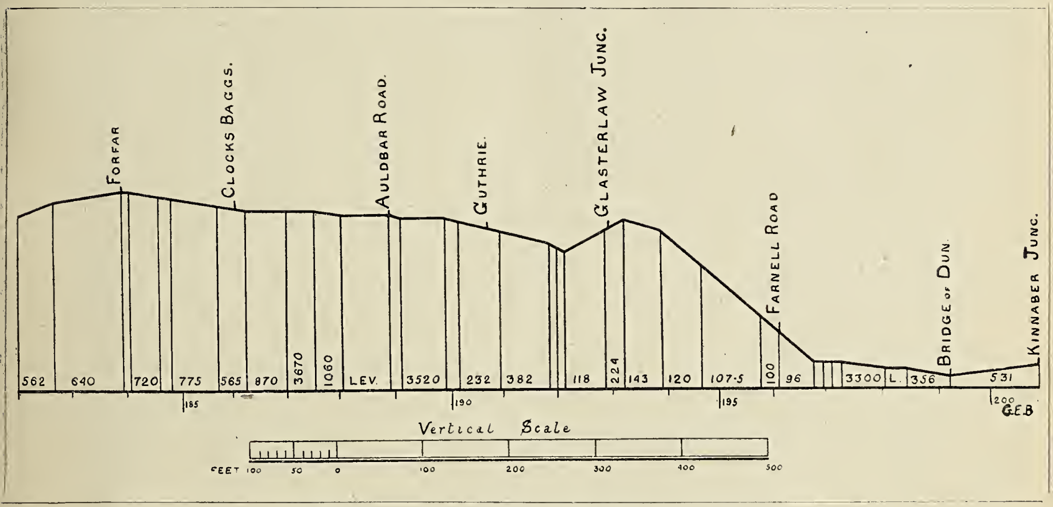


GRADIENT PROFILE, CALEDONIAN RAILWAY, MAIN LINE, CARLISLE TO ABERDEEN *(Continued from page 251).*



GRADIENT PROFILE OF CALEDONIAN RAILWAY MAIN LINE *(Continued).*

and a rise at 160 to 360, each for about 1½ mile. Except for this, and another rise at 220 for a mile before Glamis, the undulations are so slight as to make this line virtually level, until about Kirriemuir Junction comes the final rise of 3 miles to Forfar, beginning at 248, but continuing at easy grades (mostly 640) to the latter station. It will be seen that when *down* trains were booked to cover these 32½ miles from Perth in 32 minutes, start to stop, almost the whole distance was 'against collar,' with a fairly heavy 5-mile bank to face near the start. But the Caley drivers always insisted that it was "an easy road; oh, quite an easy road."*



CALEDONIAN RAILWAY'S MAIN LINE (*Continued*).

From Forfar the tableland is prolonged, but with a slight downward slope for 8 miles to a mile beyond Guthrie Junction; for the last two miles there is a definite fall at 232 to 382, the rest has almost nominal downward grades. At the 192 mile there is a sharp bit of uphill at 118 to Glasterlaw Junction, with a further bit at 224 to the summit —1½ mile of rise in all. From this summit (at the 193¼ mile-post) is a 5-mile fall to Bridge of Dun; the first three at 143, 120, and 107½ to 96; the remainder being almost level to 356. At Bridge of Dun a 3-mile bank begins† at constantly varying grades—very easy at first, but then at 105, 102 (at Dubton), and 224, ending at 185. An easy downhill 2 miles follow at once, at 482, 398, and 336 to level, after which come the broken and fairly easy ascent of 12 miles to beyond Drumlithie.

This begins with three and a half miles rising at 103, 114, and 148 past Marykirk, nearly to Laurencekirk. A downward bit for four miles to Fordoun, at 284 to nominal grades—is succeeded by a rise for over 4 miles to the summit beyond Drumlithie; this begins at 164, continues at 174 to 180, and ends at 139. This summit is the highest point in the Perth-Aberdeen section; it stands 350 feet above the datum line. Thence to Stonehaven is an almost continuous fall; the first two miles at an easy slope, with ever-changing grades (average 330), but after that at 101, 91, easing to 423 at the 222nd mile, and ending at 138 and 235. From Stonehaven there is a sharp rise, at 100

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* Now that the run is made at the same speed the opposite way (going South) the road truly is "easy." The only serious rise is the mile and a half at 1 in 140, about 21 miles from the start; the rest is all nearly level or down-hill.

† It may be said that from the 'lowest dip' at Bridge of Dun to Drumlithie is a 19 mile bank, rising 330 ft. in all; though it is broken by two down-hill stretches.

—5—18 for $2\frac{1}{2}$ miles with a fall for $1\frac{1}{2}$ to near Muchalls, at 167 and 100. From about half a mile before Muchalls station is a serrated bit for $3\frac{1}{2}$ miles, inclining upwards on the whole, at 350 at first, and then at 150 and 127, and (at end) 114; the falling bits are 170 and varying grades. From this last summit, a mile beyond Portlethen, is a continuous fall for seven miles to Aberdeen. At the beginning the grade changes continually, continuing at 166, 100 (at Cove), 108 and 118; approaching Ferryhill Junction it eases to 361 and 260, but steepens again to 96 before the Wellington Road ticket platform, until level is reached in the Aberdeen Joint Station itself.

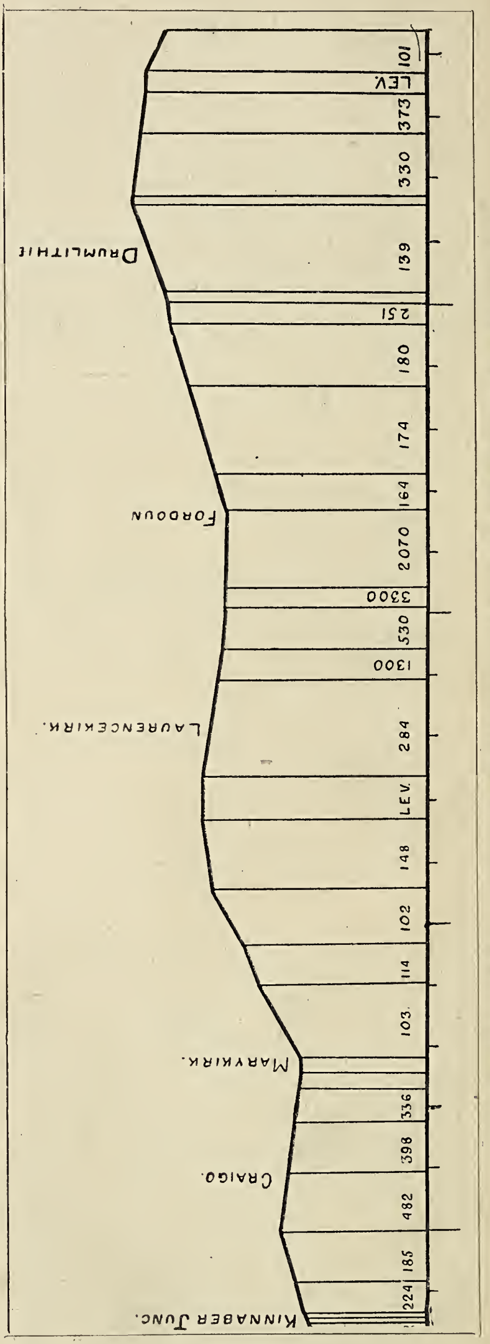
It should be noted that Up trains have practically to start on a rise of 1 in 96, and have a long, though somewhat broken, climb of twenty-three miles to the Drumlithie summit; usually with a dead stop at Stonehaven, at the foot of a 7-mile bank which in places rises at 1 in 91.

3. The Glasgow (Central) Line.

(See profile on page 340.)

This section branches off from the northern main line at Law Junction (or from the old route to the north at Motherwell). As the heaviest trains are run in the "up" direction, and also up-hill, it seems best to describe the gradients in that direction, starting from Glasgow. Also, as the top of the long bank is not reached at Law, but at the summit 5 miles beyond it, those 5 miles (to beyond Braidwood) are also described here to give a fair idea of the task which an engine has before it when it hauls the 2.0 p.m. 'diner' out of Glasgow.

The first 3 miles through the city and past Polmadie have many small undulations, but may be reckoned as almost level, but faintly upwards. Rutherglen begins the 15-mile bank to Braidwood summit, an almost unbroken climb, rising 700ft. in all, giving an average grade of about 1 in 113, though parts are as steep as 98 and 97. The first 2 miles are up-hill at 163 and 110, easing to level, followed by nearly 2 falling miles at 108, 280, and nominal grades, to Uddingston—the only real break in the bank.



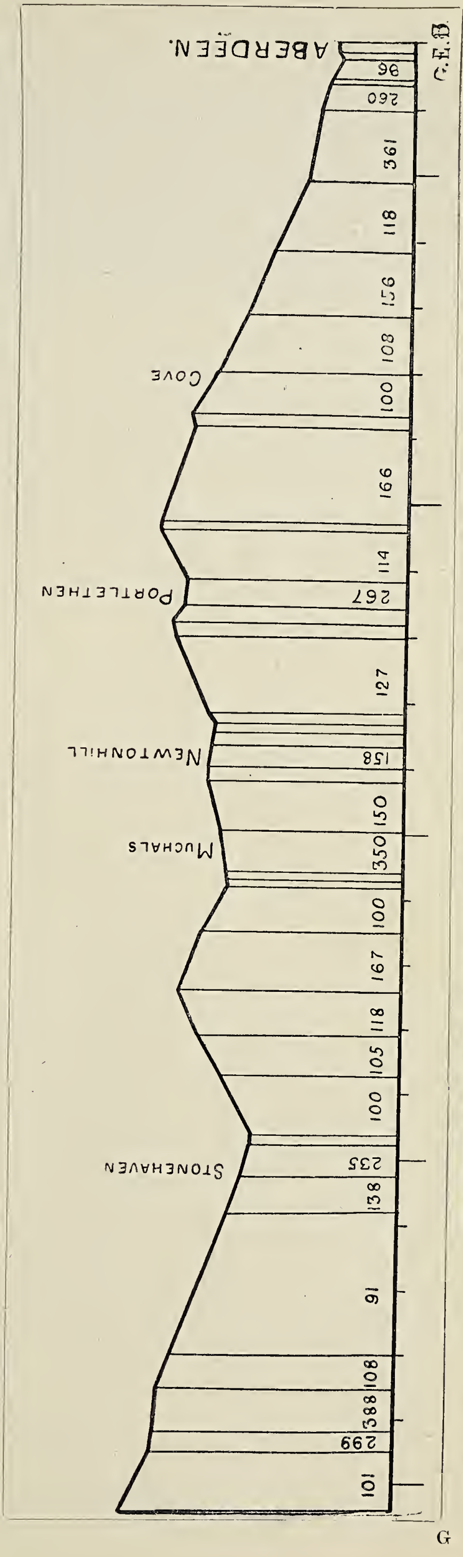
GRADIENT PROFILE OF THE CALEDONIAN RAILWAY'S MAIN LINE TO ABERDEEN (*Continued*).

From Uddingston, from which point the rise is continuous, except for a few tiny level strips, come 2 miles at 1 in 135 and 115, followed by two at constantly changing but slighter grades (178, 146, etc.) to Motherwell, where the *old* Carlisle-Perth line is joined. Thence the incline steepens again for nearly 2 miles at 116 to 137, with over 2 more (on either side of Wishaw Central Station) at 102 and 103. The next 2½ miles to Law have short grades at 113, 178, and (at the end) 1 in 99.

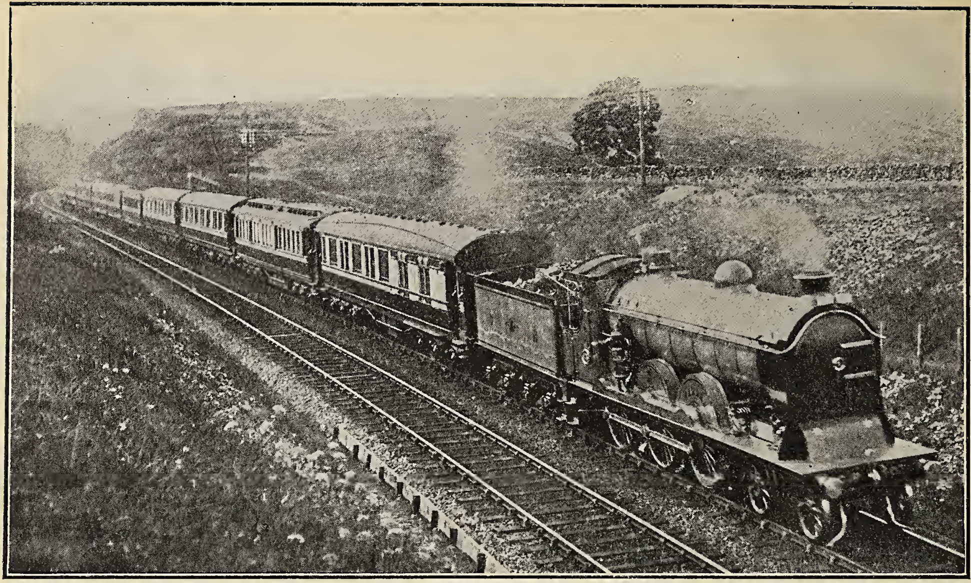
Altogether, this stretch is a hard one for trains of any weight, but for express trains of 300 to 350 tons coach-load to be hauled up it by one unhelped engine, as is now done daily, is certainly a remarkable feat.

NOTE ON THE BEATTOCK INCLINE, AS COMPARED WITH SHAP.

These two banks, "Shap" and "Beattock," coming as they both do on the main west coast through route, are so often 'bracketed,' as it were—indeed, are not seldom spoken of as if the one were as hard as the other—that it seems worth while to put in a note as to their true character, both absolutely and relatively to each other. The truth is that in one way only are they really alike—viz., that 1 in 75 is the steepest gradient for each of them. In all other respects Beattock is the harder of the two almost beyond comparison; it is nearly twice as long; it has a decidedly up-hill approach for 4 miles, while Shap has a slightly downward, or level one, for nearly the same distance. Its first 4½ miles are at 88 to 80, while the first 1¾ mile of Shap are only at 147. In getting up the Shap bank an engine climbs barely 360ft., while from Beattock Station to summit the rise is over 650. Perhaps the simplest method of comparison is to say that the last 5¼ miles of Beattock, just the length of the whole Shap bank, are at 75; thus Beattock would equal Shap plus 4½ miles at 88 to 80, even if the whole length of the latter bank (instead of only 3¾ miles) were at a continuous 1 in 75.

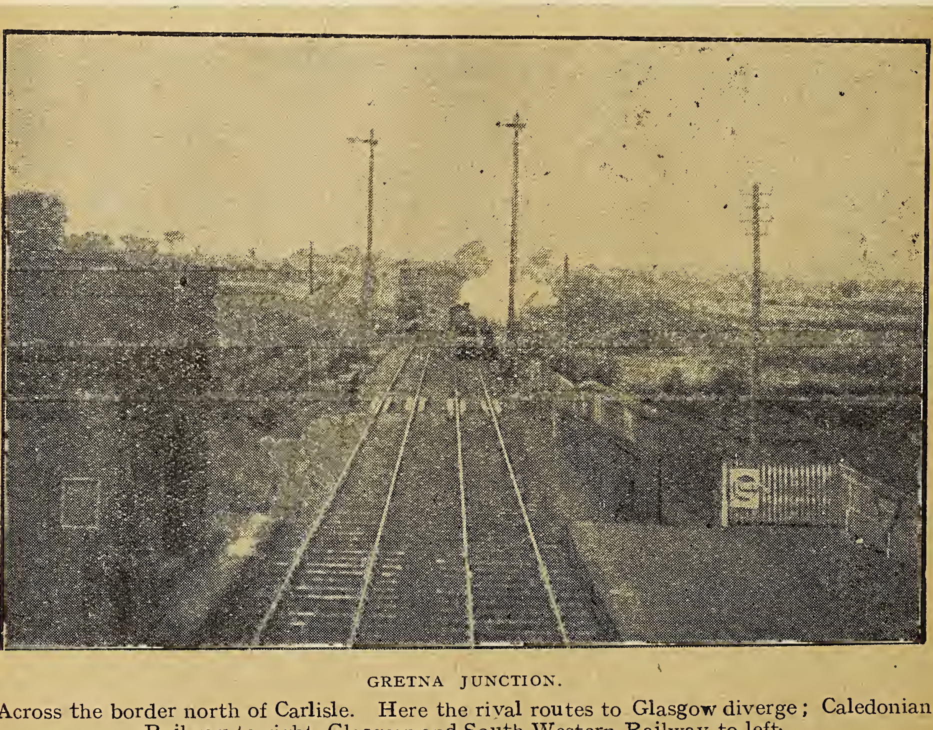


GRADIENT PROFILE OF THE CALEDONIAN RAILWAY'S MAIN LINE TO ABERDEEN (*Continued*).



Photo] CALEDONIAN RAILWAY. [*Mr. H. Gordon Tidey.*

2 p.m. Glasgow-Euston Dining Car Express descending Beattock Bank; 4-6-0 Locomotive No. 903, fitted with the Schmidt Superheater.



GRETNA JUNCTION.

Across the border north of Carlisle. Here the rival routes to Glasgow diverge; Caledonian Railway to right, Glasgow and South Western Railway to left.

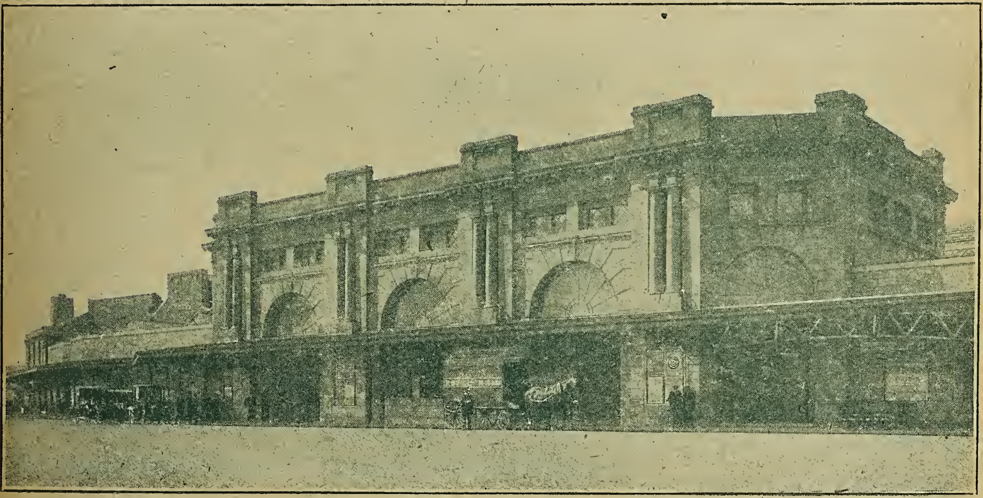
The Railway and Travel Monthly
CONDUCTED BY G. A. SEKON.
No. 75.] JULY, 1916 [Vol. XIII.

The Granite City's New Station.

(Aberdeen Joint Caledonian Railway and Creat North of Scotland Railway.)

By BURGE GARLINGE.

FOR many years Aberdeen station was a veritable *bête noire* both to railway officials and to the travelling public. Constructed fifty years ago, when the volume of traffic to and from Aberdeen and beyond was nothing like that of twenty-five years ago, the Aberdeen joint station of 1866 provided sufficient accommodation for the trains of that period and for the normal increase that could be expected to occur as matters developed. This station at the time of its erection was described as "a very handsome structure" —an appellation not endorsed by a later generation—cost £26,000, was 500 ft. long and 102 ft. broad, the side walls being 32 ft. in height. It was covered by a single span arched roof 72 ft. high in centre.



EXTERIOR OF MAIN BUILDING FRONTING THE STATION YARD.

The traffic dealt with at Aberdeen fifty years ago was that of the Caledonian Railway from and to the South—Aberdeen being then, as now, the North-Eastern terminus of the Caledonian Railway—of the Great North of Scotland Railway, of which it was the Southern terminus, whilst the Deeside Railway's trains came into the station at the south, diverging to the west at Ferry Hill Junction—a short distance south of the station. The joint station was, therefore, practically two terminal stations—the northern half for the trains of the Great North of Scotland Railway, and the southern half for those of the Caledonian and Deeside Railways.

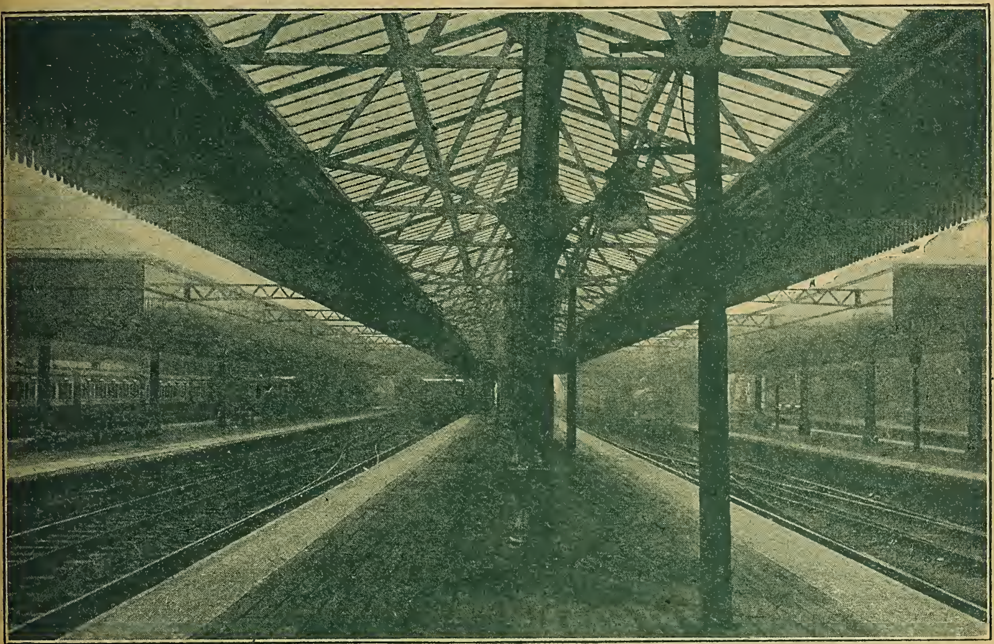
Prior to the construction of the joint station, the Great North of Scotland Railway had its Aberdeen terminus at Waterloo and the Aberdeen Railway on Guild Street (to the east of the site of joint station), whilst the Deeside Railway trains used the station of the Aberdeen Railway. In 1864 the Scottish North Eastern Railway (which had absorbed the Aberdeen Railway) obtained powers to construct the Denburn Valley Railway, through the City of Aberdeen, to connect its system with that of the Great North of Scotland Railway. By the time this connecting line was completed and the Joint Station constructed, the Great North of Scotland Railway had absorbed the Deeside Railway and the Scottish North Eastern Railway had become part of the Caledonian Railway.

THE NEW STATION FROM GUILD STREET ENTRANCE, SHOWING FISH-LOADING PLATFORM TO LEFT.

Hence, in 1866, upon the opening of the station, we find the Great North of Scotland Railway trains entering the station from both ends—at the south by running powers over the Caledonian Railway from Ferry Hill Junction, a distance of 51 chains, and the Caledonian Railway from the south.

The through traffic, beyond the exchange of through vehicles, was small and consisted of the trains of the Caledonian Railway to Inverness and the Highland system, which sought to compete with the North British Railway trains *via* Perth. Naturally the Caledonian and Great North of Scotland Railways gave the best of attention to this traffic, as the former obtained the haul of the traffic for an additional 90 miles north of Perth, instead of handing it over to the Highland Railway at the home of the "Fair Maid," whilst such traffic was wholly a gain to the Great North of Scotland Railway.

With the completion of the Tay, and afterwards the Forth, bridges, the North British Railway was able to compete more effectively with the Caledonian Railway for the Aberdeen traffic, and the North British Railway's additional trains added to the amount of traffic using the Aberdeen joint station. Furthermore, before the North British Railway had direct access to Aberdeen it had been to its advantage to send its own traffic, and that from the East Coast and Waverley routes, to Inverness and the Highland Railway *via* Perth, but its new and nearer route to Aberdeen, giving it a longer haul on its own metals, made it to the interest of the North British Railway to send such traffic *via* Aberdeen and the Great North of Scotland Railway, thus further congesting the joint station by the additional through traffic. The opening of the Forth Bridge caused the most violent competition between the East and West Coast routes, which conjoined at Aberdeen*, and culminated in the celebrated "race to Aberdeen." The congestion at the inconvenient and small joint station at Aberdeen had now become chronic, and during the Scottish season chaos reigned there. Something had to be done to relieve the pressure, and plans for a larger station and one better adapted for dealing with the through traffic, and marshalling and shunting the four distinct types of trains using the station, were now discussed. Meanwhile relief of the pressure and the passing of the chronically chaotic condition, came from another direction.



THE NORTH PLATFORMS, WITH GREAT NORTH OF SCOTLAND RAILWAY TRAIN ALONGSIDE ISLAND PLATFORM (TO RIGHT).

The Aberdeen route to Inverness and the Highland Line had become established as an effective competitor to the Highland Railway's route *via* Kingussie, so the Inverness Company sought to shorten its route and thus reduce the time of the journey between Inverness and Perth and south of that city by a direct line from Inverness to Aviemore, on the original Inverness-Perth line. This "cut-off," which was opened November 1st, 1898, reduced the distance by 34 miles, making the Highland Railway's direct route between Inverness and Perth only 118 miles, against 198 miles between the same places *via* Aberdeen, thus making it hopeless for the Caledonian and West Coast routes to effectively compete *via* Aberdeen. The North British Railway had an advantage to Aberdeen of 17 miles, for East Coast and Waverley routes traffic over the Caledonian

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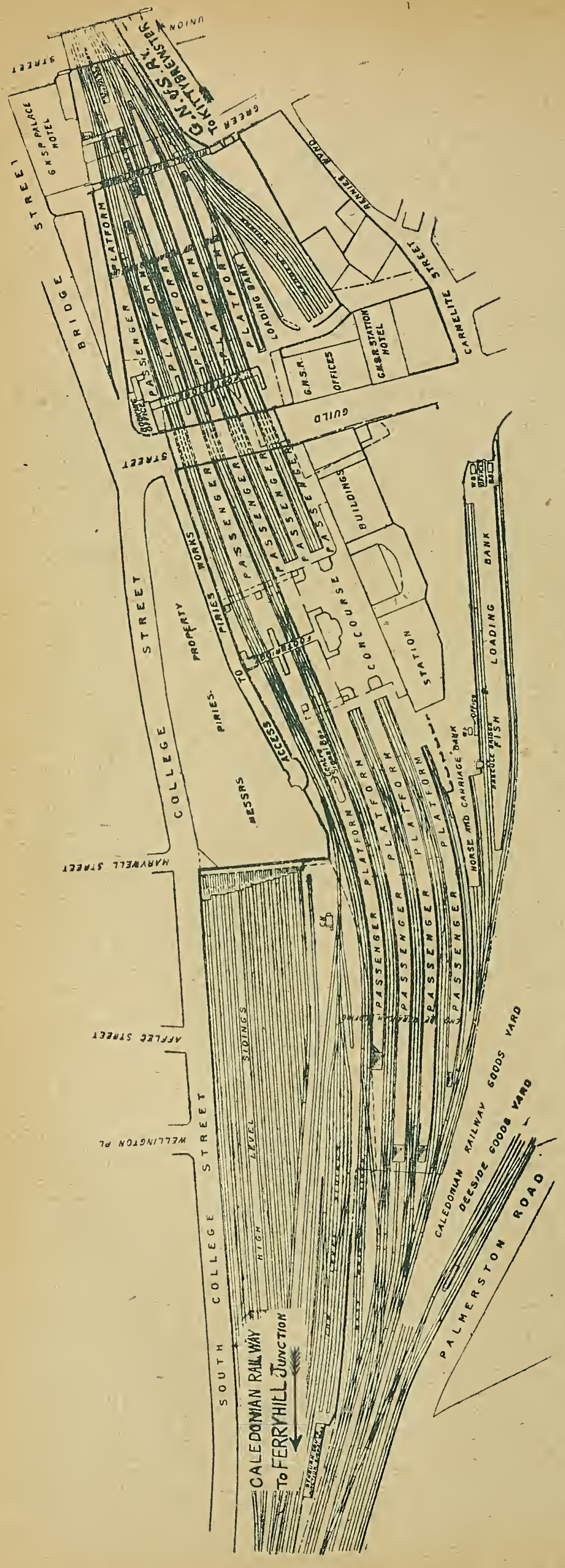
* The actual meeting-point is Kinnaber Junction, 38 miles South of Aberdeen.



PLAN OF THE NEW JOINT (GREAT NORTH OF SCOTLAND RAILWAY AND CALEDONIAN RAILWAY) STATION, ABERDEEN.

Railway's route, but the distance compared with the Perth and new direct line made the competition for the Inverness traffic *via* Aberdeen ineffective.

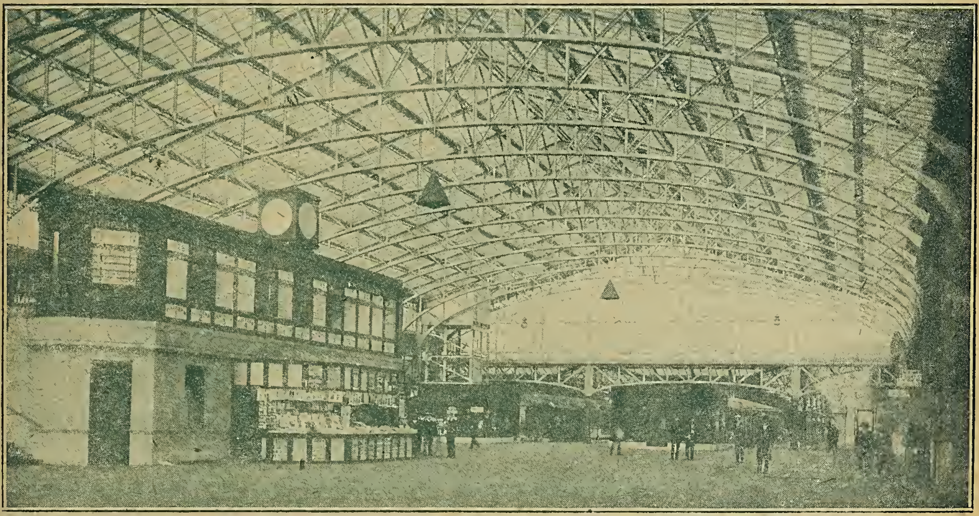
Thus relieved of much of the hustling (or competitive) traffic, and with minor improvements at the station, the old joint station continued to provide for the requirements of Aberdeen, but with the natural increase of traffic the inadequacy of the station again became apparent. When in 1905 the Highland and Great North of Scotland Railways "buried the hatchet," the withdrawal of the competing services again gave temporary relief to the congestion at Aberdeen, but a few years later it was evident that, to provide properly for the natural growth of the traffic, much increased accommodation must be provided.

A start was finally made with the new station on May 28th, 1913, on which date the foundations were put in hand. Such progress was made with this necessary initial work that by September 7th, 1913, Aberdonians had ocular demonstration that the new station was at last under construction by seeing the commencement of the demolition of the roof.

The removal of the old roof was an intricate undertaking, and it was necessary that this should be carried out before a start could be made with the building of the new platforms, etc. Two travelling stages were employed to remove the roof.

The larger of these was a working stage the full width of the old roof, and the other a crane stage supporting two 7-ton electric cranes. The iron framework of the old roof was cut into convenient pieces by oxy-acetylene blowpipes, and lowered by the cranes on to the working stage, and finally being loaded into railway trucks. As soon as the last of the old roof had been taken down, the stages were slightly altered, and used for the erection of the new roof. This work was carried out with considerable expedition. The demolition of the old roof was commenced on September 7th, 1913 (as already stated), and the last truss of the new roof over the circulating area was erected on February 7th, 1914, the glazing being finished about a month later.

The design of the new station follows that of the old one, viz.—the provision of through platforms with bays at each end for terminal traffic—those at the north end being for the main line and northern branch trains of the Great North of Scotland Railway, and those at the south end for the Caledonian Railway and North British Railway trains, as well as for those trains from the Deeside branch of the Great North of Scotland Railway which do not proceed north of Aberdeen.



THE CIRCULATING AVENUE (OR CONCOURSE) SHOWING BOOKSTALL WITH TRAIN INFORMATION BOARDS ABOVE.

Originally it was proposed that the covered portions of the new station should be surmounted by an "all-over" roof; but afterwards the plan was modified, and the platforms were provided with umbrella roofs, only the circulating area being provided with an all-over roof, which is of the Λ type, and not semi-circular as in the old station. The roof over the circulating area consists of steel trusses with elliptical bottom flanges supporting lattice purlins and patent glazing, is 245 ft. in length by 97 ft. span, with a maximum height above rail level of 50 ft. The platform roofs consist of longitudinal girders, supported on a single row of columns, carrying cantilevers, which in turn support the purlins, longitudinal gutters, and patent glazing.

The important feature in the reconstruction of the station, which rendered the work so difficult was that the traffic had to be carried on whilst the work was in progress, which meant that no part could be demolished until a duplicate, either temporary or permanent, had been provided to take its place.

The main façade of the station is on the east side of the building ; the photograph reproduced on page 2 gives a general idea of the exterior of the main frontage, whilst the view on page 1 shows the elevation of the main building of this eastern frontage from the cab-yard.

The principal entrance to the station-yard is from Guild Street, opposite the junction of Carmelite Street with that thoroughfare. Guild Street crosses the station by an overbridge, but at the far N.E. end of the yard a second access to the station from Guild Street is provided by a flight of steps, which are opposite the offices of the Great North of Scotland Railway. The short, unroofed platform seen to the left of the illustration on page 2 has been provided for loading up the express fish trains. Aberdeen being the principal fishing port of Scotland, a large traffic in the harvest of the sea is regularly despatched from the station.

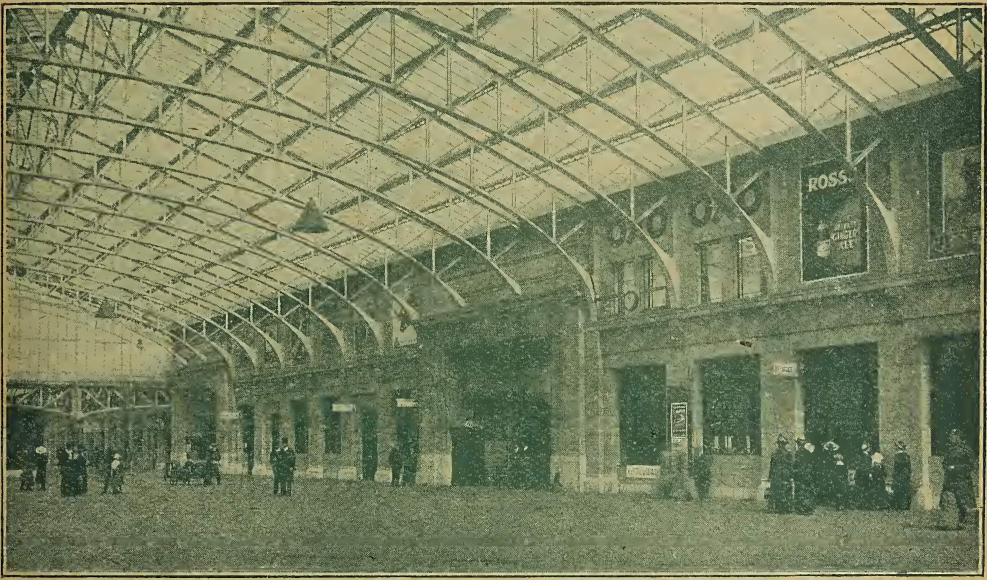
Granite and freestone have been used for facing the exterior. By examination of the sketch plan on page 4, readers will observe that large doorways lead into the booking hall, where there is situated a handsome booking office, constructed of polished teak, containing ten windows. A luggage weigh office is on the east side of the booking hall, and on the north side there is a very convenient and commodious office for receiving and giving out shop parcels. On the south wall there is an electric clock with a dial 5 ft. in diameter. All the clocks in the station are electrically controlled from a master clock placed in one of the booking offices. Two corridors, each 21 ft. wide, give access from the booking hall to the platform circulating area, from which all the platforms are reached—*i.e.*, the five terminal or dock platforms for south trains, the five terminal platforms for north trains, and the main through platforms.

THE VERANDAH OVER MAIN ENTRANCE. GREAT NORTH OF SCOTLAND RAILWAY'S STATION HOTEL IN BACKGROUND TO RIGHT.

A footbridge and luggage lifts lead from the circulating area to the island through platform, and beyond it to the western through platform, which is used for the suburban traffic of the Great North of Scotland Railway, and on which the suburban booking office is situated. Another footbridge north of Guild Street connects this booking office with all the platforms, and furnishes a more direct access from Bridge Street to the station than the main entrance.

In addition to these two station overbridges, the platforms are spanned by Guild Street and Windmill Brae (foot) bridges to the north of the station buildings, whilst Union Street spans the railway just beyond the northern extremities of the platforms.

The illustration of the circulating area on page 5 shows, in the centre, facing travellers as they enter from the booking hall, a handsome block of buildings, containing bookstall, station superintendent's office, telegraph office, and an overhead train information office. At the latter office large display boards are mounted above the bookstall showing the platforms at which the various trains will depart and arrive, with the principal stations served. These train indicatoı boards are illuminated from behind at night.



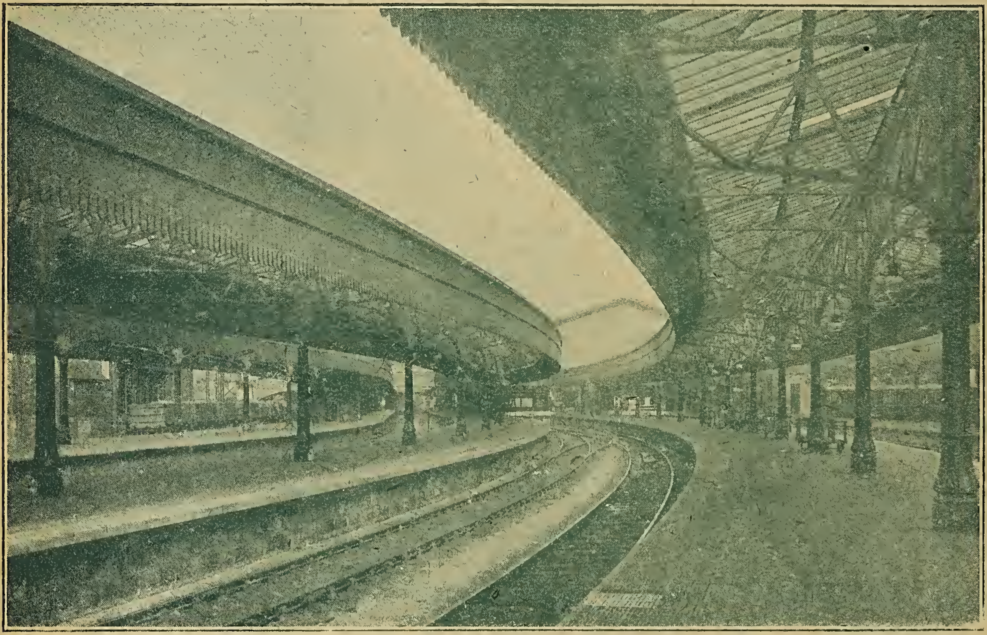
THE CIRCULATING AREA, LOOKING NORTH.

At the north and south ends of the circulating area are platform enquiry offices of the three railways. In the south-west corner is a tobacco stall, and in the north-west corner a fruit and confectionery stall. On the west side of the circulating area are two electric luggage lifts for transporting passengers' baggage to the through platforms. On either side of the central building wide stairways lead to the footbridge giving access to the island and western through platforms. The refreshment rooms are placed on the east side of the circulating area in the main block of the station buildings, and form an attractive suite of rooms. The dining-room is 41 ft. long and is panelled in mahagony, with mosaic floors. The first-class and third-class refreshment rooms are of similar design, but are panelled in oak.

The appurtenances are of a down-to-date character ; they include hairdressing saloon, and bath and dressing rooms. The waiting-rooms are situated in the main block, north of the refreshment rooms, and comprise a general waiting-room, first and third-class ladies' rooms, and a gentleman's first-class waiting-room.* At the south end of the circulating area is a convenient and commodious left-luggage office.

The station offices, etc., are warmed throughout from a steam-heating plant, and this also supplies hot water to the waiting-rooms and to the bathrooms. A novel use of this installation is made in winter, when it provides steam to heat the trains standing at the platforms before the locomotives are attached. Pipes for this purpose have been laid to the platforms, where they can be connected with the train heating systems of the trains standing at the platforms.

The station is entirely lit by electricity, which is also used to illuminate the various signals. The principal platforms are covered with asphalt. The west platforms, on which there is less traffic, are paved with adamant slabs. The drains, water-pipes, heating-pipes, gas-pipes, and electric mains are laid in conduits beneath the platforms.



PLATFORMS AT THE SOUTH END, SHOWING UMBRELLA ROOFS.

The convenience of the railway staff engaged at and visiting the station has not been neglected : there are rest-rooms for the guards, porters, and other members of the railway and station staffs. A small hall has also been provided where the ambulance classes can be conducted or lectures given to the railway staff.

The Great North of Scotland Railway's parcels office is situate north of the Booking Hall, and those of the Caledonian and North British Railways at its south end.

The signals are manually operated ; the station and its approaches are controlled by three signal-boxes—Denburn South Junction signal-box, at the south-end of the station ; Centre signal-box, on the island platform ; and Aberdeen north signal-box, at the north end of the station.

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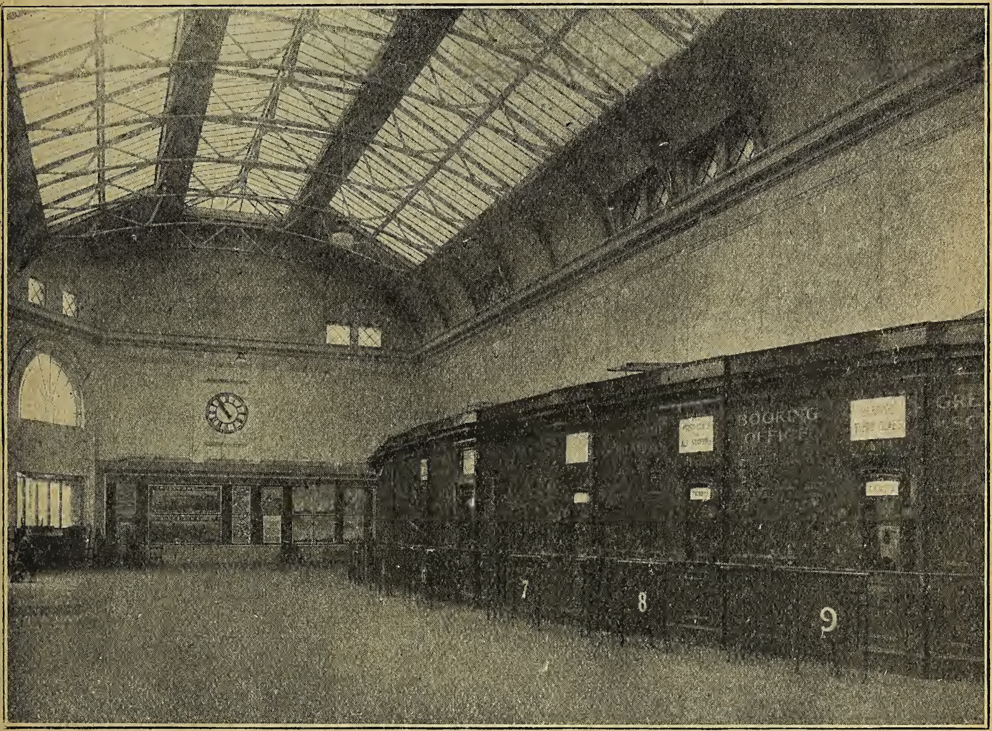
*At present utilised as a Red Cross soldiers' and sailors' rest-room.

10, 11, 12, and 13 (north bays), for Great North of Scotland Railway trains from the north. 6, through line platform. 7-8, through line island platform. 1, 2, 3, 4, and 5 (south bays), for Caledonian Railway and North British Railway trains and Great North of Scotland Deeside trains. 9, for suburban or Great North of Scotland Railway local trains.

The Great North of Scotland Railway loading dock is east of platform No. 13, and parallel with this are the Hadden sidings, situate at the back of the Company's general offices. From the direction of Ferry Hill junction the station is approached by six running lines, two of which are the goods lines. The two pairs of through lines (four roads) are each provided with scissors crossings about the centre of the station.



SOUTH END OF BOOKING HALL, SHOWING TICKET WINDOWS 5 TO 9.

The down-to-date signalling at the north end of the new joint station was carried out by Messrs. McKenzie & Holland, Ltd., the well-known railway signal engineers and contractors, of 119, Victoria Street, Westminster, in accordance with the plan prepared by the G.N. of S. R.'s Chief Engineer, Mr. J. A. Parker.

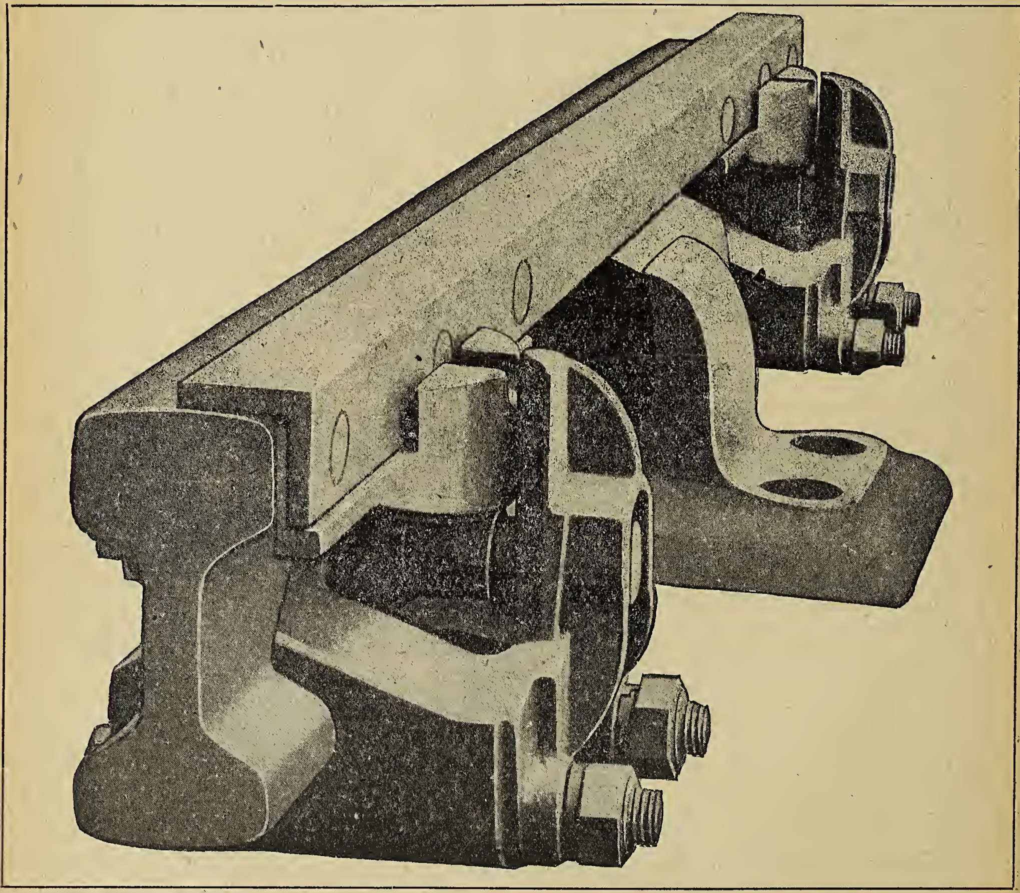
This complete installation is controlled by a manually operated locking frame in the North Box, containing 150 levers, viz.: 58 for working 58 signals, 4 for controlling 7 signals, 17 for working 17 ground disc signals, 23 for working 40 points, 24 for working 24 facing point locks and bars, 1 for working 1 clearance bar, 2 for working 2 release locks on ground frames, and 21 spare levers.

The signalling appliances are for the most part of the standard pattern in use on the Great North of Scotland Railway; a notable exception, however, being the type of facing point lock-bar used. This is claimed to be a great improvement upon the usual form of "outside" lock-bar, as due to its unique motion over the rail it is a very safe and efficient detector (see illustration below).

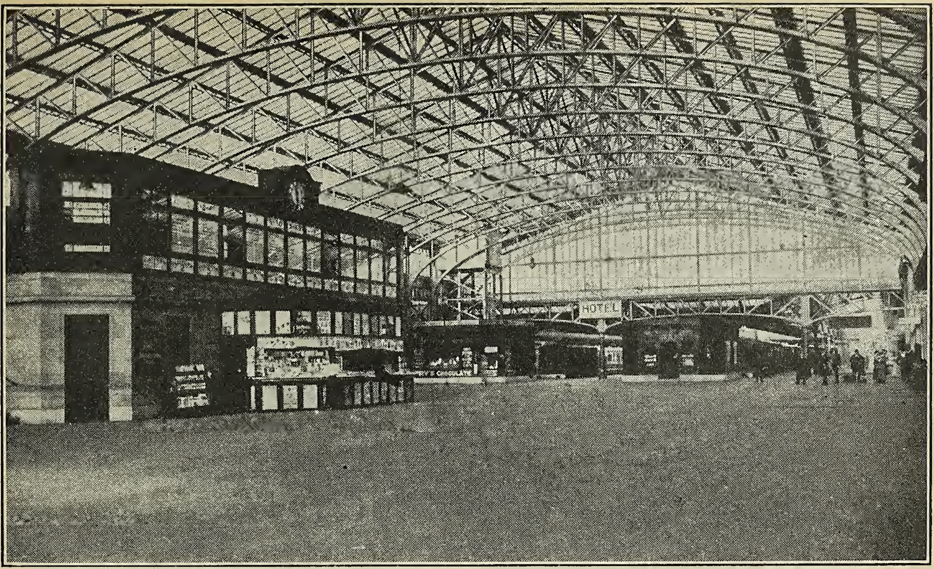
Messrs. McKenzie & Holland are now fitting a considerable installation of track circuiting to the Aberdeen new joint station.

The new station is (in the length of platforms the fifth largest in Great Britain), and in Scotland is second only to Waverley station, Edinburgh.

The number of arrival and departure trains in the twenty-four hours is just over 200, apart from goods traffic and other train and engine shunting movements. There are thirteen platforms, with a total frontage of 2⅛ miles (11,862 ft.) and a surface of 174,240 sq. ft., or 4 acres. The average width of the platforms is 24 ft. To secure efficient control of the platforms, wrought-iron barriers with gates are being erected at each. The longest platform (No. 6) is 1,596 ft., and the shortest (No. 1) 540 ft. The total floor area in the new station buildings is 50,700 sq. ft., as against 14,200 in the old station, the new being therefore fully three and a half times larger than the old. The roof area is 166,068 sq. ft.; and that of the station buildings 40,500 sq. ft. Including the new goods yards, etc., for the Caledonian and Great North of Scotland Railways, at the south end of the station, and the new sidings, etc., at the north end for the Great North of Scotland Railway, the two railways have expended over £750,000 at Aberdeen in connection with the new station, etc.



McKenzie & Hollands' "over-rail" outside lock-bar, as fitted at the Aberdeen new station, shown in its mid-travel position over the rail.



GENERAL VIEW OF CONCOURSE.

Notable Railway Stations and their Traffic.

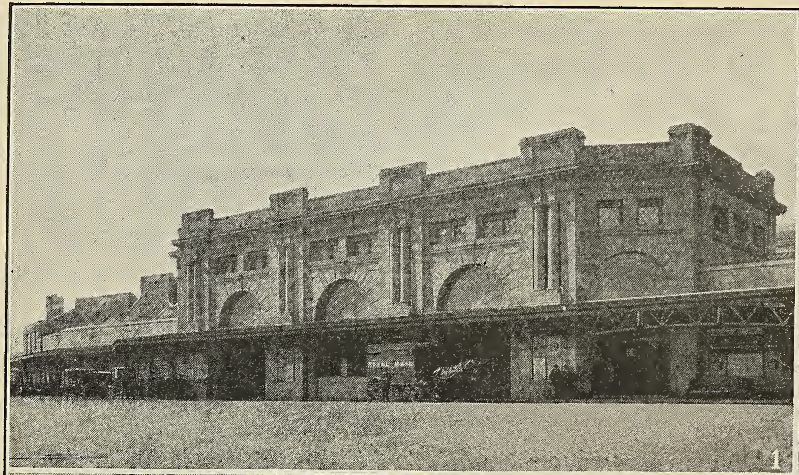
ABERDEEN JOINT PASSENGER STATION: CALEDONIAN AND GREAT NORTH OF SCOTLAND RAILWAYS.

By J. F. GAIRNS.

As the third largest city in Scotland, a great fishing port, and an important industrial and agricultural centre, Aberdeen is necessarily the objective or source of railway traffic on a considerable scale, and nearly all is dealt with *via* the Joint Station or, on the goods side, the extensive yards adjoining. For traffic purposes three railways are concerned, Caledonian, North British and Great North of Scotland, the two former introducing direct associations with all the lines composing the main trunk routes from London and other towns in England to the north of Scotland. In the case of the North British Railway, however, access to Aberdeen is obtained only by virtue of running powers over the Caledonian Railway from Kinnaber Junction, some 38 miles to the south of the "Granite City," so that only the Caledonian and the Great North of Scotland Railways share in the ownership of the Joint Passenger Station.

Prior to 1867 the Great North of Scotland had its terminus, for both passenger and goods traffic, on the side of the harbour at Waterloo Quay, about half a mile from the present station, while the Aberdeen Railway (afterwards merged into the Scottish North Eastern Railway, now part of the Caledonian system) had its terminus in a small station approximately on the site of the Caledonian Company's present Guild Street Goods Depôt. The Aberdeen Company's station also accommodated Deeside Railway trains.

The hiatus then existing between lines north and south of Aberdeen early called for connection, and so in 1867 a jointly-owned station for passenger and goods traffic was opened, to be used by al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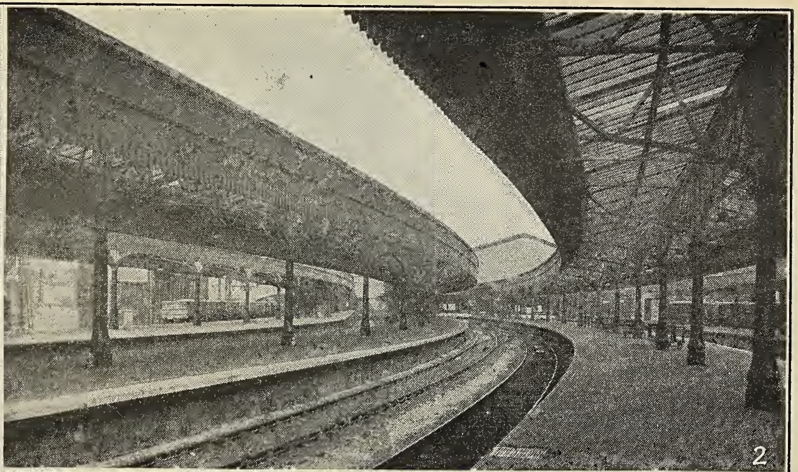
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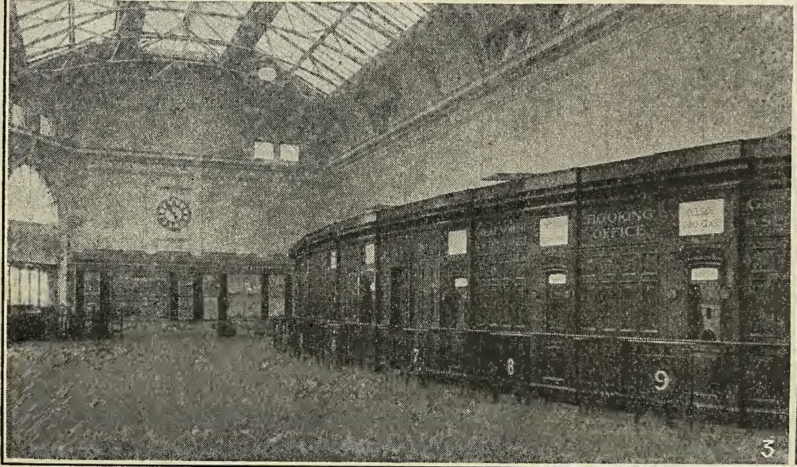
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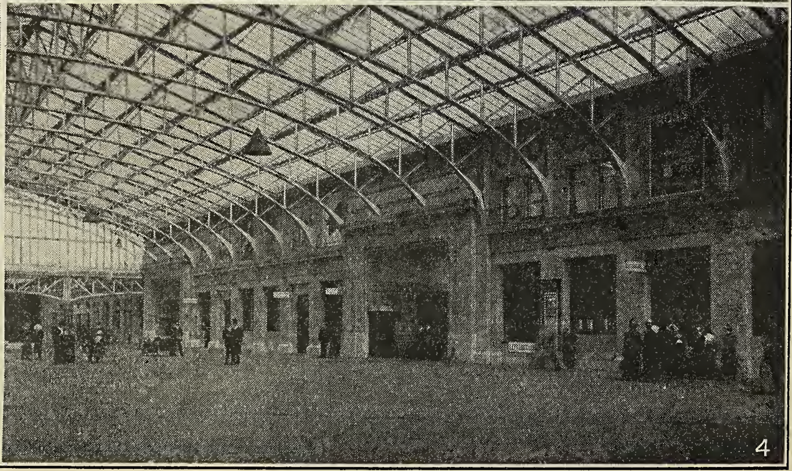
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1.—MAIN BOOKING HALL AND STATION BUILDINGS.
3.—INTERIOR OF BOOKING HALL.

2.—PLATFORMS AT SOUTH END OF STATION.
4.—CONCOURSE AND STATION BUILDINGS.

the railways then concerned—the Great North of Scotland, Deeside and Scottish North Eastern as owners, and the North British by running powers. With the absorption by the Great North of Scotland Railway of the Deeside Company in 1875, the ownership became dual, Caledonian (as successors to the Scottish North Eastern) and Great North of Scotland, with the North British as running-power tenants of the former company.

The old joint station dates from 1864, and was opened for traffic November 4, 1867. It had two through lines for passenger traffic, one only with a passenger platform, and two through lines for goods traffic to the west of the passenger part of the station, with two bay lines to the north, and three to the south.

As there is a considerable volume of interchange traffic, the single through platform line in the main station became very much overtaxed, during more recent years, and therefore in 1913 entire reconstruction and enlargement of the station was commenced, and completed early in 1915. For this work, Mr. J. A. Parker, M.Inst.C.E., Chief Engineer, Great North of Scotland Railway, was responsible as engineer to the Joint Station Committee; the contractors being Messrs. P. and W. Anderson, Limited, of Glasgow.

This reconstruction had to be carried out without interfering with traffic on the same site, but was completed in remarkably short time, a start being made on May 28, 1913, while in October, 1914, the last remnant of the old station was removed. Now there are no fewer than 13 platform lines (four of them through and the longest extending for 1,596 ft.), aggregating in length 11,340 ft., making Aberdeen Joint station one of the most convenient in Great Britain. Architecturally it is distinctive, and in this respect Aberdeen Joint is entitled to be included as one of Britain's finest railway stations. Indeed, partly because it is a new station, but also in view of the special care taken to retain the wonderful suggestion of cleanliness and neatness which seems to characterise the station, Aberdeen Joint conveys to the visitor a unique impression of brightness and orderliness. Everywhere the overhead glazing is kept scrupulously clean, while the many examples of splendid cabinet work receive daily attention to prevent dust accumulating in crevices and corners.

The general design and construction of the station was fully described in the RAILWAY MAGAZINE, October, 1915, so that it is only necessary to refer to the principal features in this respect, before proceeding to consideration of the traffic and work of the station.

The special feature is the spacious concourse and the booking hall, and their adjacent premises. The station yard, a wide area communicating with Guild Street, gives splendid road access. Along the frontage of the station is a verandah-covered pavement leading to steps passing under an arched portal direct to Guild Street immediately opposite the head offices of the Great North of Scotland Railway Company, while doorways communicate with the booking hall and the parcels offices of the railways using the station.

An artistic glazed roof ensures good lighting to the booking hall, which is distinctive for spaciousness and the splendid woodwork of the ticket section, with 10 booking windows, and other offices. The booking hall also accommodates the luggage weigh office, lost property office, a window for shop parcels and a cab office, while a large electric clock on the south wall is another distinctive feature.

Passing through either of two wide corridors, the main concourse is reached, covered by a fine glass and steel roof, 245 ft. long and 97 ft. wide. Immediately opposite, approaching from the booking hall south corridor, is a block of buildings containing bookstall, stationmaster's office, and Telegraph Office at platform level, and overhead a large train information indicator. On either side of this block are wide stairs giving access to a footbridge which leads to platforms Nos. 7, 8, and 9 on the west side of the station. From the concourse direct access is had to Nos. 1, 2, 3, 4 and 5 south terminal lines, No. 6 through line, and Nos. 10, 11, 12 and 13 north terminal lines. At the north and south ends of the concourse are small buildings containing fruit stall, tobacco stall, and the Passenger Agents' Offices of the Great North of Scotland, Caledonian and North British Railways.

Along the main wall, north and south of the booking hall, are the following offices: gentlemen's lavatories, Great North of Scotland Railway parcels office, ladies' third-class and first-class waiting rooms, gentlemen's waiting room, tea and refreshment room, corridor from booking hall, dining room, first and third-class refreshment rooms, corridor from booking hall, left luggage and bicycle office, Caledonian and North British Railway parcels offices, hair-dressing saloon with bath and dressing rooms and gentlemen's lavatories.

Special mention may be made of the dining room and the hair-dressing saloon. In view of the arrival of sleeping-car trains from England in the neighbourhood of 7 to 8 a.m., there is a large call for breakfasts, following a bath, so that in the course of the season large numbers of long-distance travellers avail themselves of these facilities. The dining room is a splendid apartment, 41 ft. long and panelled in mahogany and floored with mosaic. The service is exceptionally good, and a wide selection of viands is available for passengers at all times. Indeed, many business people in the town make regular use thereof for lunch. The dining and refreshment rooms are under the direct supervision of the Great North of Scotland Railway hotel department.

From the concourse the platforms extending north and south are protected by verandah roofs, almost for their entire lengths. Guild Street is carried over the station a little to the north of the concourse, and at the corner of Bridge Street is a small booking hall, with book and tobacco stalls, and connected by a footbridge leading to the platforms. Near the north end of the station is Windmill Brae footbridge, a public right-of-way not connected with the platforms, while from No. 6 is a covered slope and footbridge leading directly into the Great North of Scotland Railway Company's "Palace Hotel," claimed to be, and deservedly so, the finest hotel in Aberdeen. Connected directly with the station, and with porters attending upon passengers arriving or departing, this hotel is exceptionally convenient.

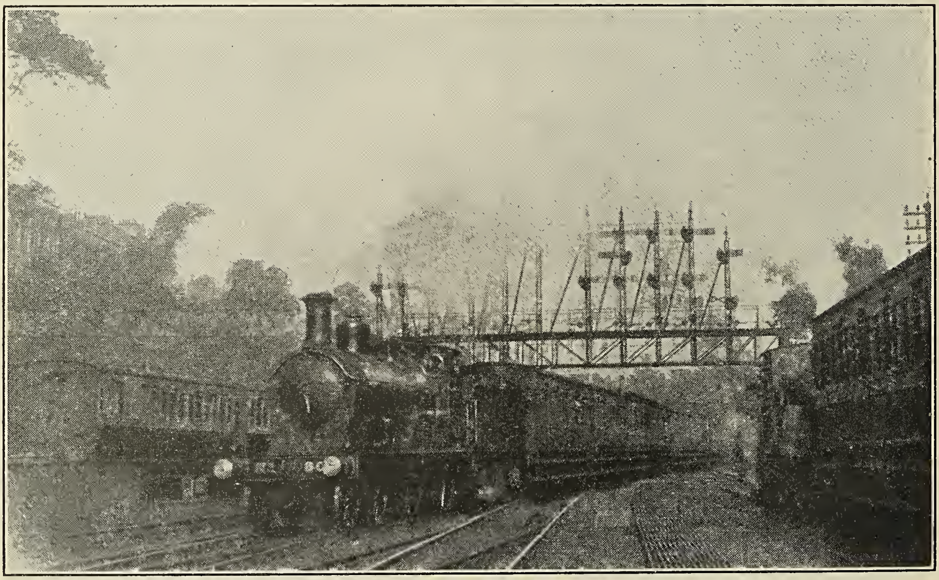


Photo.] G.N.S.R. TRAIN ARRIVING FROM THE NORTH. [*J. F. Gairns.*

During the shooting season as many as 70 sleeping car passengers may reach Aberdeen in one morning, and while many travellers have a bath and breakfast in the station, large numbers find it convenient to proceed to the hotel and to stay for a day or two before continuing their journeys. Aberdeen is, indeed, a good centre in itself, as journeys can be made conveniently in all directions therefrom, while the town contains much of interest, and has a fine sandy beach and coast attractions, and a number of excellent golf courses within easy walk or a short tram ride. The Palace Hotel, together with the Station Hotel in Guild Street, also owned by the Great North of Scotland Railway Company, is, therefore, largely patronised both by business men and by holiday travellers, while the fact that Aberdeen is on the route to Deeside and Ballater (for Balmoral) and the estates of many Scottish notabilities, causes the Palace Hotel to be frequently visited by our own and foreign royal personages and others.

The Palace Hotel has 81 bedrooms, and besides its private apartments, including a lounge, at one time Queen Victoria's private suite, has public dining rooms approached directly from Union Street, which are in great favour with town residents and visitors. The hotel is also frequently used for balls and public dinners, while when the Court of Sessions is sitting it becomes the scene of judicial hospitality and of city functions associated therewith. The Station Hotel is devoted more to commercial and family purposes. It has 49 bedrooms. Both hotels are under the direction of Mr. A. A. Ryan, Mr. G. Souter being assistant manager. During the war the Palace and Station hotels were largely used by naval and military travellers, as Aberdeen was an important naval centre. It also provided the only route to Russia then available.

Returning to the station, beyond No. 1 platform is a horse and carriage loading dock accessible from the courtyard, and adjacent is a double-sided fish platform. Here the special fish trains are loaded for the south, usually two Caledonian and one North British, daily, and as the lorries bring up the fish from the market, past the weigh office and alongside the wagons, the scene is a busy one. The platform is of considerable width, but at times, to avoid conflicting movements of road vehicles, a bascule bridge (with interlocking gear) is lowered across one line near the south end of the platform, so that the lorries can pass to the roadway serving the horse and carriage loading dock, and so to the station courtyard and away. To the east of the fish-loading bank are the Caledonian Company's Guild Street goods yard (used also by North British trains) and the Deeside goods yard of the Great North of Scotland Railway.

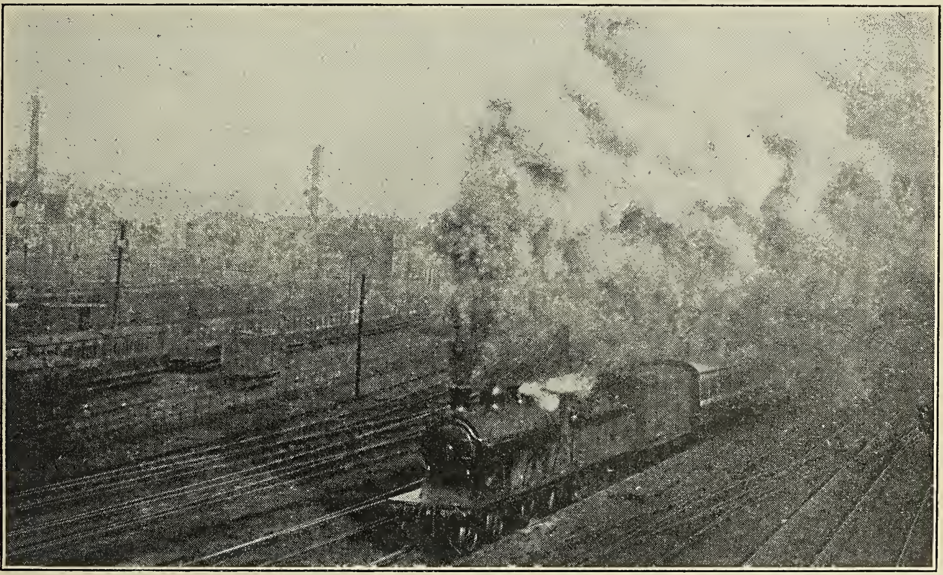


Photo.] C.R. PULLMAN CAR EXPRESS LEAVING FOR THE SOUTH. [*J. F. Gairns.*

On the opposite side of the station, at the south end, are the Clayhills high level and low level sidings, with exchange lines wherein through goods trains from the north or south are transferred between the three railways concerned. The high level sidings are partly used for storage of passenger rolling-stock, including the joint stock trains on the English services.

At the north end of the station, spanned by the magnificent arch which carries Union Street over the railway, space is somewhat limited. At this end is a north traffic horse and carriage loading dock, while Hadden's sidings provide limited carriage storage accommodation. Alongside Union Terrace Gardens are the Terrace sidings and the turntable, but there is not much space to spare here, so that the Great North of Scotland Railway is still compelled to stable many of its trains out of service at Kittybrewster.

From the north two lines only are available, leading to Nos. 9, 8, 7 and 6 through lines and to terminal platforms Nos. 10, 11, 12 and 13. Traffic at this end is controlled by Aberdeen North signal cabin (127 levers and 23 spare). Southwards the station lines lead to the main and west up and down lines, with up and down goods lines, and a shunting spur on the east side. Aberdeen Centre box (60 levers) controls traffic within the station, while the large Denburn South box (217 levers and 23 spare) deals with passenger and goods traffic to the south. There are also two ground frames operating the scissors crossings between Nos. 2 and 3 and 4 and 5 terminal lines, under electrical control.

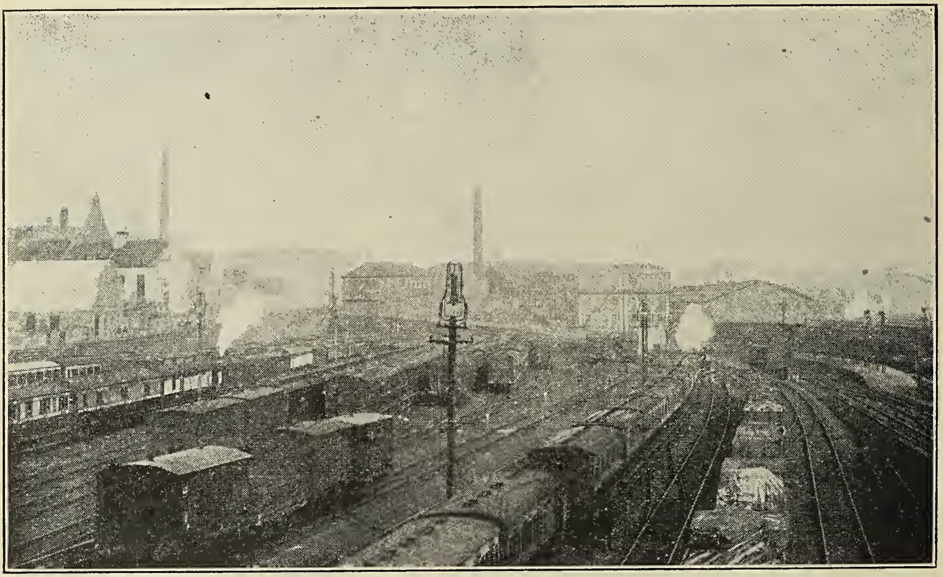


Photo.] CLAYHILLS SIDINGS, JOINT STATION TO RIGHT [*J. F. Gairns.*

A notable feature of traffic at Aberdeen is the suburban traffic operated by the Great North of Scotland Railway north and west. Notwithstanding the competition of the Corporation tramways, these trains, worked by 0-4-4 tank engines, convey a considerable volume of residential traffic. To Culter, on the Deeside line, trains usually leave No. 9 platform, while Dyce trains, to the north, use Nos. 7 or 8. In both cases the service is at least hourly, and at busy periods more frequently. As a rule the engines run round their trains at Aberdeen, by means of the crossovers available, but certain trains work through, complete, between Dyce and Culter.

To a considerable extent the platforms are regularly allocated to particular services, substantially as follows :—

No. 1. Caledonian locals.
,, 2. Caledonian main line.
,, 3. North British.
,, 4. Deeside.
,, 5. As required.

No. 6. As required and through transfer.
,, 7. } Dyce suburban.
,, 8. }
,, 9. Culter suburban.
,, 10. Keith, Elgin, Inverness, &c.
,, 11. Peterhead, Fraserburgh, Cruden Bay.
,, 12. Macduff and Alford.
,, 13. As required.

On the Caledonian side there are the special Pullman and restaurant car expresses between Aberdeen and Glasgow, the services to Edinburgh, and to England via the West coast route, and the special "Limited Mail" trains. There are also slower and local trains. North British services consist mainly of the through Edinburgh-Aberdeen and East Coast expresses.

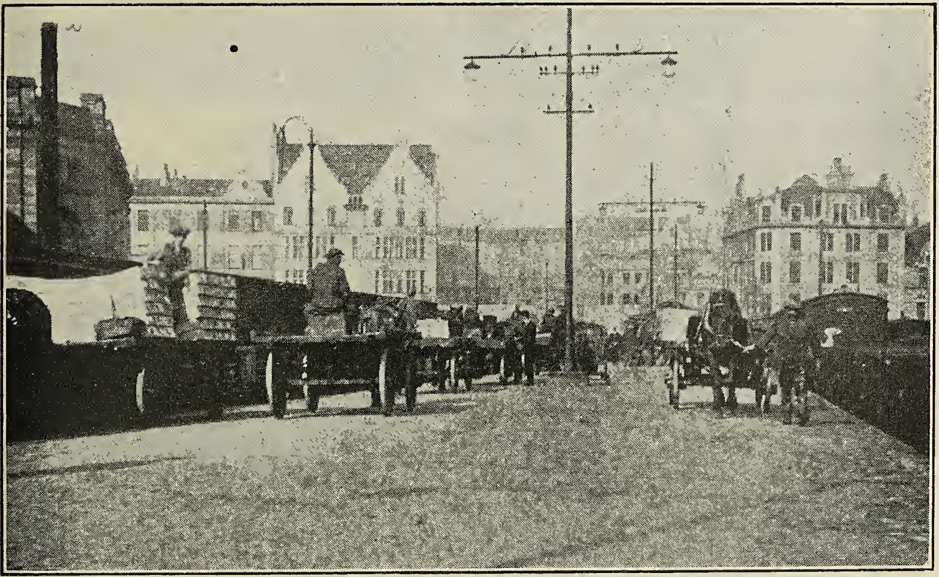
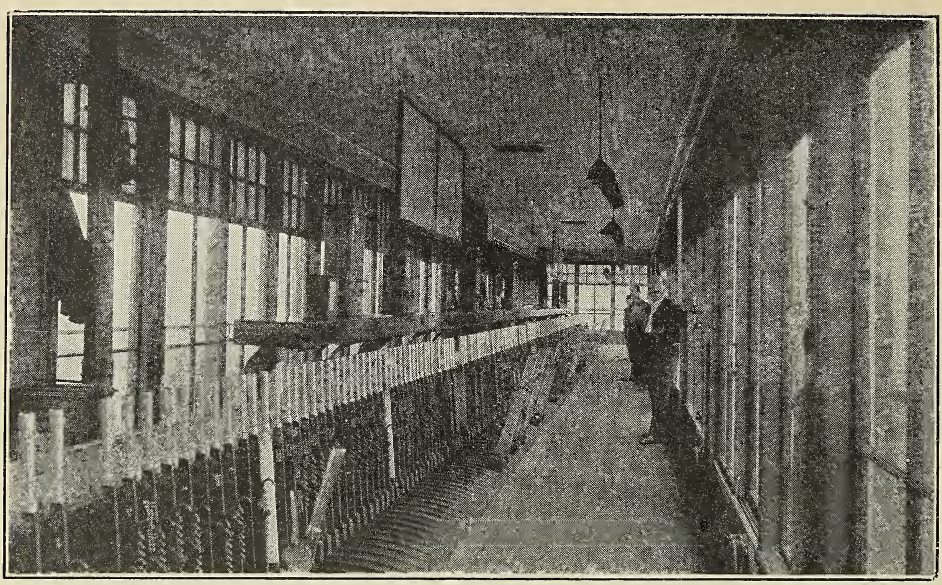


Photo.] **FISH-LOADING PLATFORMS.** [*J. F. Gairns.*

About 200 trains are normally dealt with daily, but in the season these totals are considerably increased, and during the times of special holiday pressure, and in connection with the Aberdeen spring, summer and autumn holidays, and at the New Year, the station is often used almost to its full traffic capacity by the relief and additional trains run. Other events which produce much special traffic are the Highland Cattle Show, and the Glasgow holiday week. On the last occasion (1920) about 15,000 passengers were booked from Glasgow to Aberdeen, or to places involving change here to the Great North of Scotland Railway.

A large proportion of the trains dealt with are of a main line character, so that luggage and the more complex features of station work are generally involved in a considerable degree. The work entailed by the departure of the Glasgow, Edinburgh and English expresses, and on their arrival, is frequently very heavy, while the numerous services of the Great North of Scotland Railway, and the mail business, combine to render the station a scene of animation at all periods of the day. In general the station is an open one, but portable barriers are erected when it is desired to close off any platform.

In pre-war days a special feature of Great North of Scotland traffic was the express excursions on Wednesdays and Saturdays to Ballater, Boat of Garten, Elgin, Cruden Bay, &c., and although excursion facilities can as yet only be given in an attenuated form, and at rates which will not compare with those of 1913, a large traffic is conducted at ordinary or 1920 excursion fares on all routes. Some of the tours operate in conjunction with the well-known motor omnibus routes



INTERIOR OF DENBURN SOUTH SIGNAL BOX.

for which the Great North company is noted, as between Ballindalloch and Tomintoul, Alford and Kildrummy and Strathdon, Fraserburgh and Rosehearty and New Aberdour, Ballater and Braemar, Huntly and Aberchirder, Aberdeen and Newburgh, Cluny, Echt and Midmar, and the famous Three Rivers Tours by "Rail, Motor and Coach via the Dee, Don and Spey."

During the past season, excursions have also been operated by the Caledonian Company to Muchalls and Stonehaven, and other places along the rocky Kincardineshire coast, which the railway follows so closely for many miles.

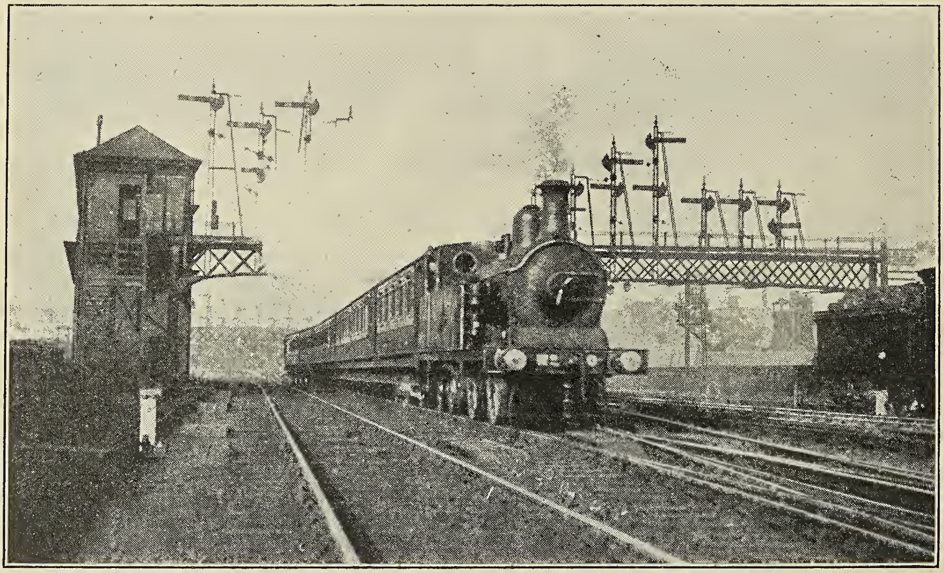


Photo.] [*J. F. Gairns.*

G.N.S.R. SUBURBAN TRAIN PASSING DENBURN SOUTH SIGNAL CABIN.

Golf is also a great attraction, and it is sufficient to mention Cruden Bay, and the Great North of Scotland Company's hotel there, together with other courses served by the railways concerned, to appreciate that this is no small factor in the traffic passing through Aberdeen.

As a principal fishing centre Aberdeen itself sends about 60,000 tons of fish to the English markets, but a great deal passes through. During the herring season Fraserburgh and Peterhead alone provide 14,000 to 15,000 wagons of fish for the south, exchanged at Aberdeen. During the war period the Aberdeenshire coast served one of the licensed fishing areas, and in 1918 no fewer than 12,000 tons of fresh herrings, kippers, &c., passed through Aberdeen during June, July, August and September. In 1919, the total was about 8,000 tons, and in 1920 6,000 tons, against 2,500 tons in 1912. These exceptional totals were partly due to the conditions existing during the war period, and the closing of German and Russian ports for general fishing traffic, but in any case they would be very high.

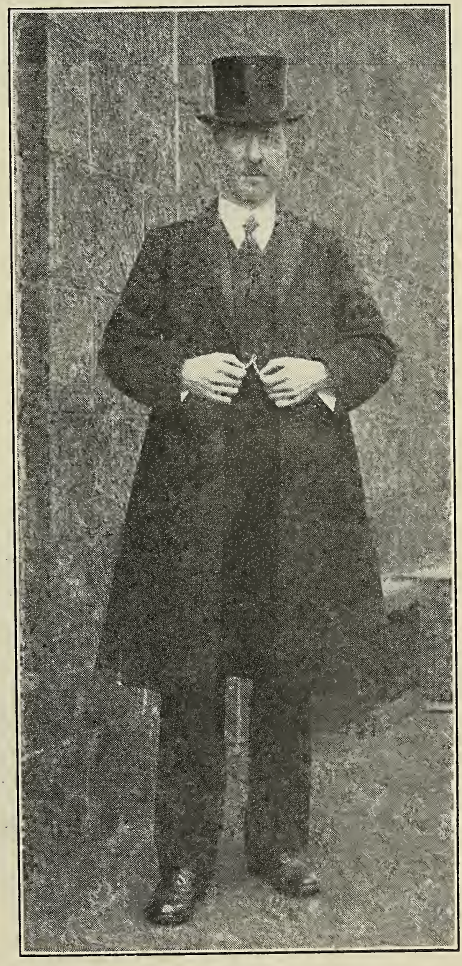
Including that landed at Aberdeen and the traffic passing through from the Great North of Scotland Railway, the Caledonian and the North British Companies deal with about 89,000 tons of fish annually at Aberdeen, representing some 270,000 parcels of fish conveyed by passenger or special fish trains.

A total of some 3,000,000 passengers per annum use Aberdeen Joint station, exclusive of season-ticket holders. Bookings here are heavy, but large numbers of passengers have through or return tickets, so that exact figures are difficult to estimate. Among the special features of the traffic may be mentioned the annual migrations of fishworkers who travel from the fishing centres on the Great North of Scotland Railway to Lowestoft and Yarmouth for the herring season. These girls often number 3,000 or more, and on the occasion of his recent visit to Aberdeen the writer was enabled to witness the departure of a special conveying some 300 or so to East Anglia.

Also affecting the passenger station is a large traffic in milk, horses, and pedigree cattle, conveyed by passenger train, while 800 to 1,000 wagons of exchange goods traffic pass through the station daily.

During the war period Aberdeen was exceptionally busy, as an important naval centre. Mr. J. MacGregor, O.B.E., the Caledonian District Superintendent, whose offices are in Guild Street, close to the station, records 185 ambulance trains conveying 21,627 sick and wounded soldiers or sailors, while the naval stores dealt with reached enormous totals.

The staff of Aberdeen Joint station is regarded as joint on the traffic working side. Mr. D. McNicoll, M.B.E., occupies the responsible post of stationmaster. He is assisted by Inspector Bruce (from G.N.S.R.) and Inspector Collins (from C.R.), with a staff of about 100, including



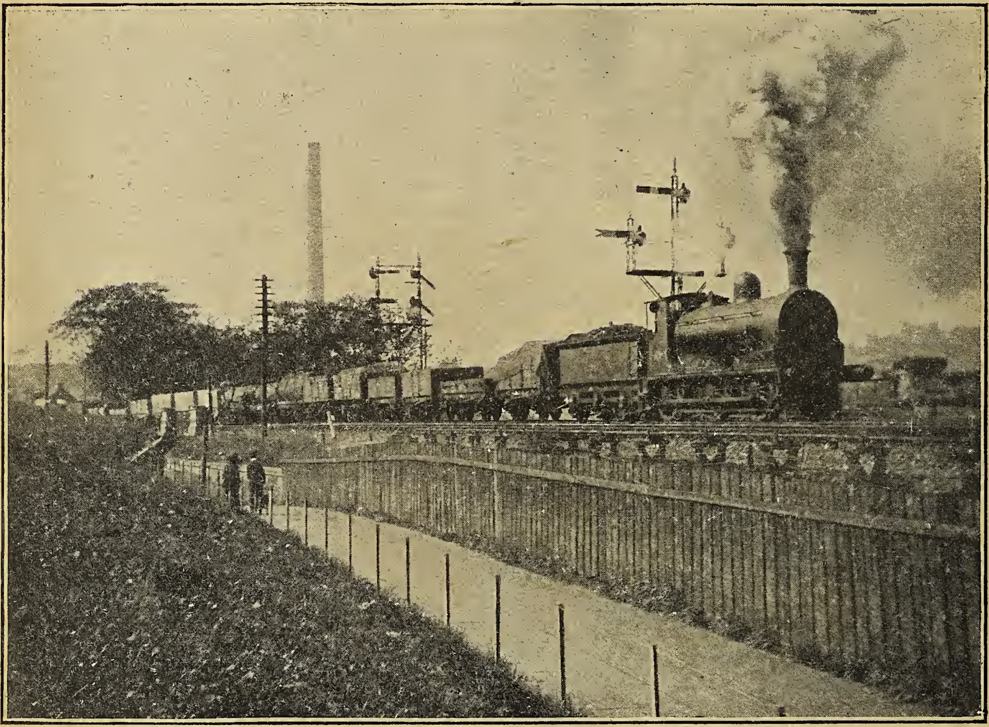
MR. D. McNICOLL, M.B.E.
Stationmaster, Aberdeen Joint Station.

clerks, foremen, policemen, signalmen, shunters, porters, &c.

Besides these there are about 170 other employees engaged in traffic peculiar to one or other of the three companies concerned. Mr. J. Lamont, Passenger Agent, Mr. D. Gibb, Parcels Agent, and Mr. W. Greig, Booking Agent, deal with the commercial side of Caledonian traffic. Mr. J. McNeil is North British Agent, Mr. J. Bremner is G.N.S.R. Parcels Agent, and Mr. J. Kemp is G.N.S.R. Booking Agent. Speaking generally, therefore, each company looks after the business side of its own traffic, except that to some extent North British traffic is covered by Caledonian or Caledonian and North British joint staff, while the traffic working of the station proper is under the supervision of the stationmaster, who receives his instructions from the headquarters of the owning companies. Mr. T. S. Mackintosh, Secretary, Great North of Scotland Railway, acts as Secretary, Aberdeen Joint Passenger Station Committee.

In conclusion, the writer is indebted to Mr. G. Davidson, General Manager, Mr. W. Johnston, Superintendent of the Line, Mr. J. A. Parker, Chief Engineer, and Mr. A. A. Ryan, Hotels Manager, Great North of Scotland Railway; to Mr. R. Killin, C.B.E., Superintendent of the Line, and Mr. J. MacGregor, O.B.E., District Traffic Superintendent, Aberdeen, Caledonian Railway; and to Mr. McNicoll and his staff, and representatives of other railways, for many courtesies and for valuable assistance in collecting material for this article.

A MIXED LOAD.



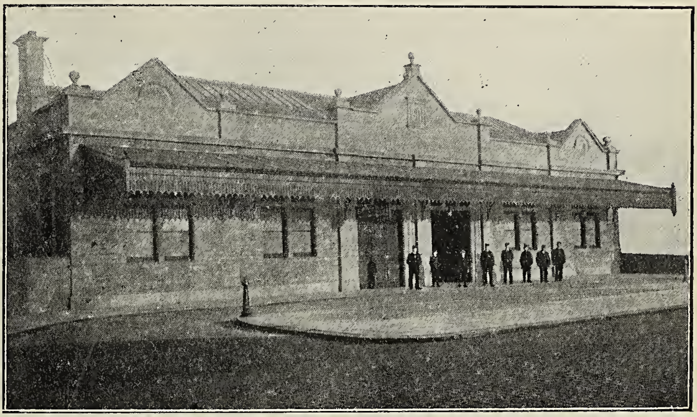
Photo] [*A. E. Glen.*

CALEDONIAN RAILWAY.

Goods train passing Dawsholm Junction, Glasgow.
0-6-0 Locomotive, No. 353.

March 1912

The New Station at Arbroath.



Photo] EXTERIOR OF NEW STATION, ARBROATH. [Geddes & Son.

IN the minds of the inhabitants most places have a pet grievance against the railway serving them, and Arbroath had a particularly acute one with regard to its passenger station, which, consequent upon its physical position, was 'cribbed, cabined and confined.' Traffic grew and grew, but no way out could be discovered to improve the station. Rumour has it that because the station was 'joint'—it is the property of the Dundee and Arbroath Joint Railway, which is owned by both the Caledonian and North British Railways—no lever could be applied by which the desired improvements could be brought about.

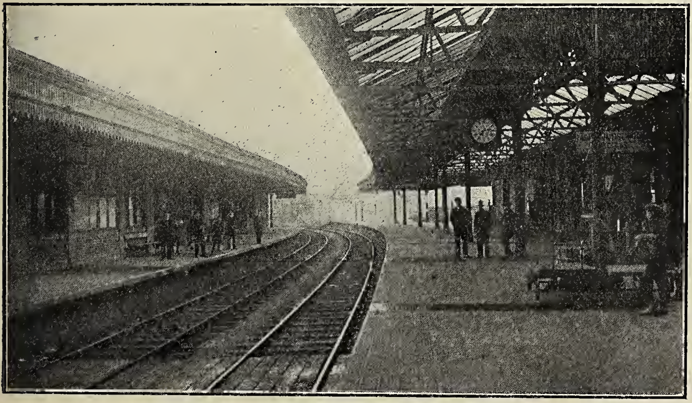
At last, however, the reconstruction and enlargement of the station, etc., could no longer be delayed, so Parliamentary powers were obtained for the necessary work in the North British Railway Act of 1907. The actual work of reconstruction being commenced in the summer of 1909, and being completed, the new station was opened to the public on Christmas Eve last.

The new station occupies the same site as the old, but the passenger accommodation has been very much extended. This has necessitated the building of heavy retaining walls on both sides of the Railway to the south of Keptie Street, the entire reconstruction and widening of Keptie Street Bridge, and the remodelling of the Goods Station.

The main entrance, shown by the illustration at the top of this page, is from Keptie Street, where a new carriage access, set back from the line of the street, leads up to the Booking Hall.

The Booking Hall is of spacious dimensions, and has an elevation in keeping with the other buildings to Keptie Street. The inside work is of panelled pitch pine, the roof being designed so as to give the maximum of lighting.

Access to the platforms is provided by

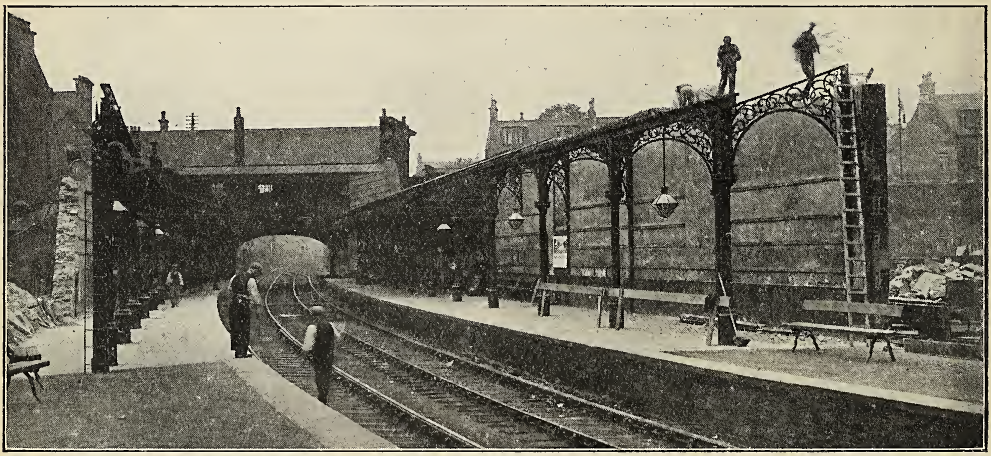


Photo] [Geddes & Son.
THE NEW STATION AT ARBROATH, LOOKING NORTH.

means of wide staircases, these in turn being connected by means of a covered-in footbridge. Passengers desiring to cross from one platform to the other are thus able to do so without encroaching on the Booking Hall space.

For dealing with luggage two 30 cwt. electric hoists have been installed, communicating between the platforms and street level.

Waiting Rooms and other conveniences for passengers, with ample accommodation and of down-to-date design, have been built on both the up and down platforms. The Parcels Office is placed on the up platform, with an access from Catherine Street.



Photo] DEMOLISHING THE OLD STATION. [*A. A. Inglis.*

The platforms from the Booking Office for about three-quarters of their length are entirely roofed over, the design being of light steel work with the usual type of glazing. The platforms are now 750 feet long, and sufficient width has been provided to deal with the crowds that so frequently are to be found at Arbroath station.

On the west side of the down platform a loop platform has been provided to deal with local traffic. The illustration at the bottom of page 297 shews the new up main platform on the right and the new down main platform on the left.

New Goods Offices have been provided at Robert Street to accommodate the Staff of the Joint Line responsible for working the traffic.

The drawings for the alterations and new station were prepared and the work carried out under the supervision of Mr. Charles J. Brown, Mem. Inst. C.E., then Engineer-in-Chief to the North British Railway, the Resident Engineer being Mr. C. A. Falconer.

The Permanent Way Works were carried out by the North British Railway men.

THE RAILWAY MAGAZINE.

NOVEMBER, 1900.

RAILWAY PORTRAIT GALLERY.

MR. WILLIAM PATRICK,

General Manager Caledonian Railway Company.

MR. WILLIAM PATRICK, the general manager of the Caledonian Railway, whose portrait appears in this issue of the "Railway Portrait Gallery," was born in Strathaven in 1853. At the age of six he was sent to the Hamilton Academy, which he continued for about three years, and thereafter he attended St. John's Grammar School, Hamilton. Mr. Patrick remained at St. John's School until he was thirteen years of age.

On leaving school, Mr. Patrick entered the office of the manager of the Hamilton Gasworks. When he was about fifteen years of age, he went to the office of the then manager of the Caledonian Railway Company, the late Mr. Smithells, from which he has risen to his present position. Shortly after Sir James Thompson was appointed general manager, Mr. Patrick became Parliamentary clerk to that gentleman, and has remained closely associated with him in every development of the company since. His capacity for Parliamentary work, and the ability he displayed in questions of general policy brought Mr. Patrick into prominence in the service, and as opportunities offered, he showed that he was equal to every occasion, and demonstrated a capacity for work and an ability to carry it through in such a manner as to increasingly gain the confidence of the general manager, and attract the attention of the directors.

In 1889, Mr. Patrick was appointed assistant traffic superintendent of the line and assistant general manager in 1891, and to his present position February 1, 1900.

As a witness on railway matters, Mr. Patrick is undemonstrative, but pointed and practical.

While in Hamilton, Mr. Patrick was an ardent Volunteer, being a member of the "B" company. He was a member of the shooting team, and was a crack shot. He greatly relished his Volunteer connection, and even long after he had left Hamilton he used to return to attend the drills.

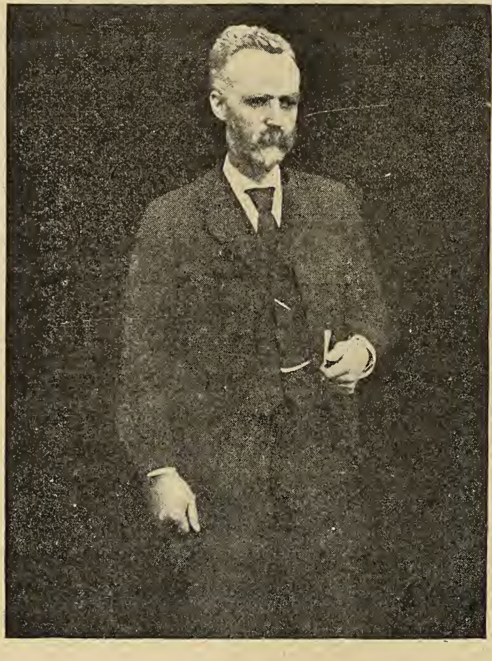
Mr. Patrick is a Lieutenant-Colonel of the Engineer and Volunteer Staff Corps.

Notable Railway Stations

IX.—CARLISLE CITADEL.

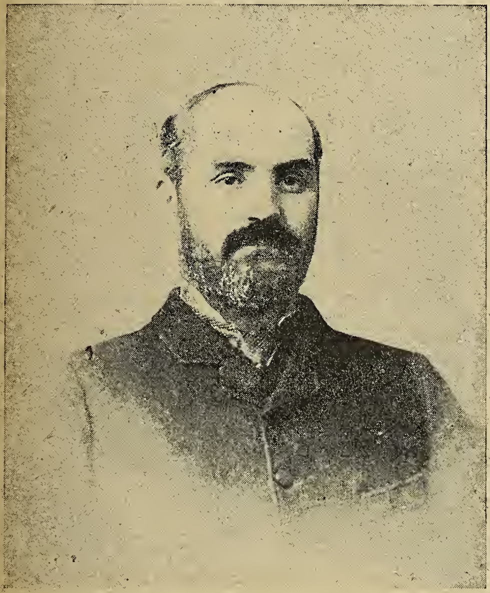
By H. V. French.

IT is not an exaggeration to describe Carlisle Citadel Station as one of the best known, best managed, and most important railway centres in the United Kingdom. Situated near the site of the Citadel, which at one time formed the southern bulwark, or English gate, of the defences of the ancient fortified City of Carlisle, the railway station has, after several enlargements, assumed gigantic proportions. Even now, in the height of the tourist season, its large area, covered with a glass roof seven acres in extent, is inadequate to the strain put upon its platform resources, and the reason for this congestion of traffic becomes obvious when it is remembered that Carlisle is the terminus of no fewer than seven railway systems, while it is the connecting link between the two kingdoms of two out of the three great trunk lines from London giving connection with Scotland. Every through passenger train which leaves either Euston or St. Pancras for "the land of the mountain and the flood," must draw up at one or other of the numerous platforms in Carlisle Citadel Station; and, in addition to this pressure of express traffic, accommodation has to be found for the ordinary trains of the London and North-Western, the Midland, the Caledonian, the North British, the Glasgow and South-Western, the North-Eastern and the Maryport and Carlisle lines. Geographically speaking, the railways converge upon Carlisle as follows: The London and North-Western, from Euston, via Crewe and Preston, from the South; the Midland, from St. Pancras, via Leicester, Normanton and Skipton, also from the south; the Maryport and Carlisle, from

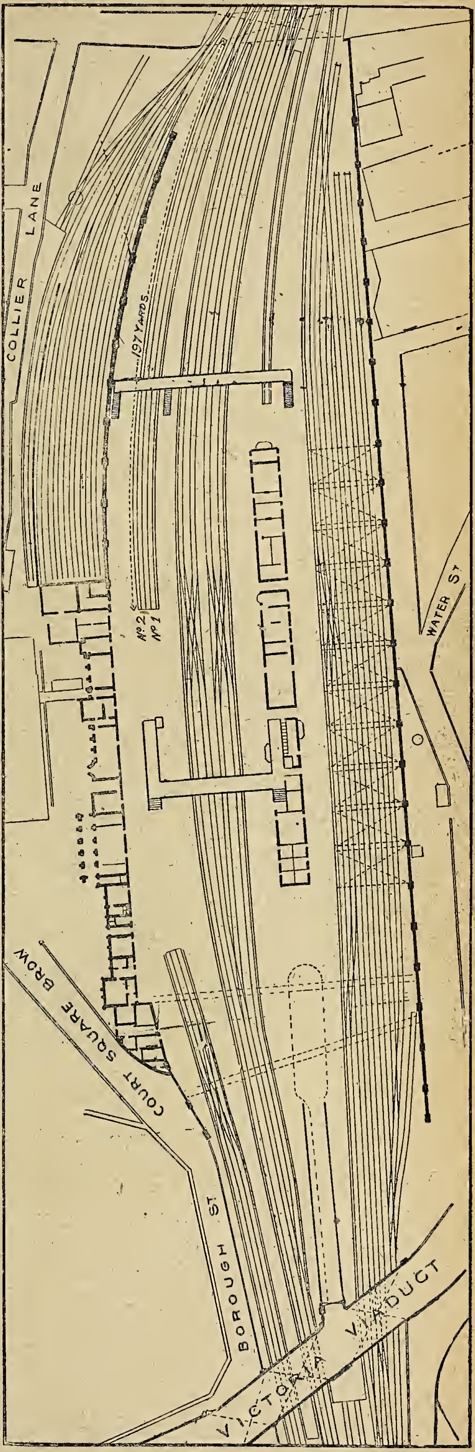


MR. J. THOMPSON,
Secretary Carlisle (Citadel) Joint Station Committee.

West Cumberland, from the west; the North-Eastern (Newcastle and Carlisle) from Newcastle, from the east; the Caledonian, from Aberdeen, Edinburgh (Princes Street), and Glasgow (Central), via Carstairs, from the north; the North British (Waverley route), from Edinburgh (Waverley), via Galashiels and the "Land of Scott," from the north-east; the Glasgow and South-Western, from Glasgow, via Kilmarnock, Dumfries and the "Land of Burns," from the north-west; and the Silloth section of the North British Railway, from the west. It will, therefore, be seen that Carlisle Citadel Station has to provide for the passenger trains of seven distinct railway companies, which enter the station from eight points of the compass. Long ago it was found necessary to exclude all goods and mineral trains from the Citadel Station. Each of the companies named above have their separate goods depots and engine-sheds situated at various points, some of which are a considerable distance from the centre of the town. Railway lines circumvent the city, by means of



MR. W. HAYTHORNTHWAITE.
Superintendent Citadel Station, Carlisle.



PLAN OF THE CITADEL STATION, CARLISLE.

which goods, minerals and other merchandise can be transferred from one company's system to another, so that the Citadel Station is left free for passenger and express fish traffic only. And it is fortunate that this excellent arrangement, necessitated by circumstances years ago, was wisely effected, in 1877 by the Joint Board under which the Citadel Station is controlled.

An idea of the animated scenes witnessed in Carlisle Station, at all hours of the day and night, can best be gathered from the following graphic details, which appeared in the "Carlisle Journal," on August 17th, this year:—

EXTERIOR OF CITADEL STATION, CARLISLE.

"HEAVY RAILWAY TRAFFIC THROUGH CARLISLE.

"A Record Train.

"The officials at the Citadel Station have just experienced a period of almost unparalleled pressure, owing to the "rush" to Scotland, which year by year shows a tendency to increase rather than diminish. In spite of some fears lest the war and other events might have a depressing effect on the travelling public at the present time, this August has been ushered in on the Royal West Coast Route extending from London (Euston) through Carlisle to Edinburgh, Glasgow, Oban and Aberdeen by the most enormous amount of passenger traffic on record. The night of August 10th, and the morning of the 11th, is always a memorable period in regard to long-distance traffic on the trunk lines. This year the fact that the 12th of August fell on a Sunday tended to spread the pressure over a little longer interval, but the officials of the London and North-Western Railway at Euston, the

Citadel Station staff, and the Caledonian officials northwards have had a busy time. Some idea of the amount of the traffic can be gathered from the fact that on the night of August 10th, thirteen Scotch expresses left Euston, and over 300 beds were made up in the trains for first-class tourists only. The first portion of the 7.45 p.m. was filled with first-class passengers, all for the Highland Railway, via Dunkeld. The second portion was also for the Highland line only. The next train to leave was the first portion of the 8 p.m., all of which was for Aberdeen. This express created a record by reaching Carlisle at 2.12 a.m., exactly at time—a feat never before accomplished on any August 10th. The second portion of the same train was for Aberdeen and Oban. Ten minutes later followed the Stranraer boat express, close on the heels of which ran the special horse and carriage train for all parts of Scotland. The express leaving at 8.50 p.m. was for Glasgow (Central) only. Ten minutes afterwards followed a heavy train for Edinburgh only, with a second portion labelled for the North. Last of all came the fastest train on the West Coast route, the 11.50 p.m., in two portions, the first bound for Glasgow, and the second for Edinburgh and the North. Nearly all these trains were made up equal to 19½ vehicles, but although the weight was so great and the time between each none too long, wonderful time was kept to Carlisle. As stated above, the train due in Carlisle at 2.12 a.m., with a load of 19½

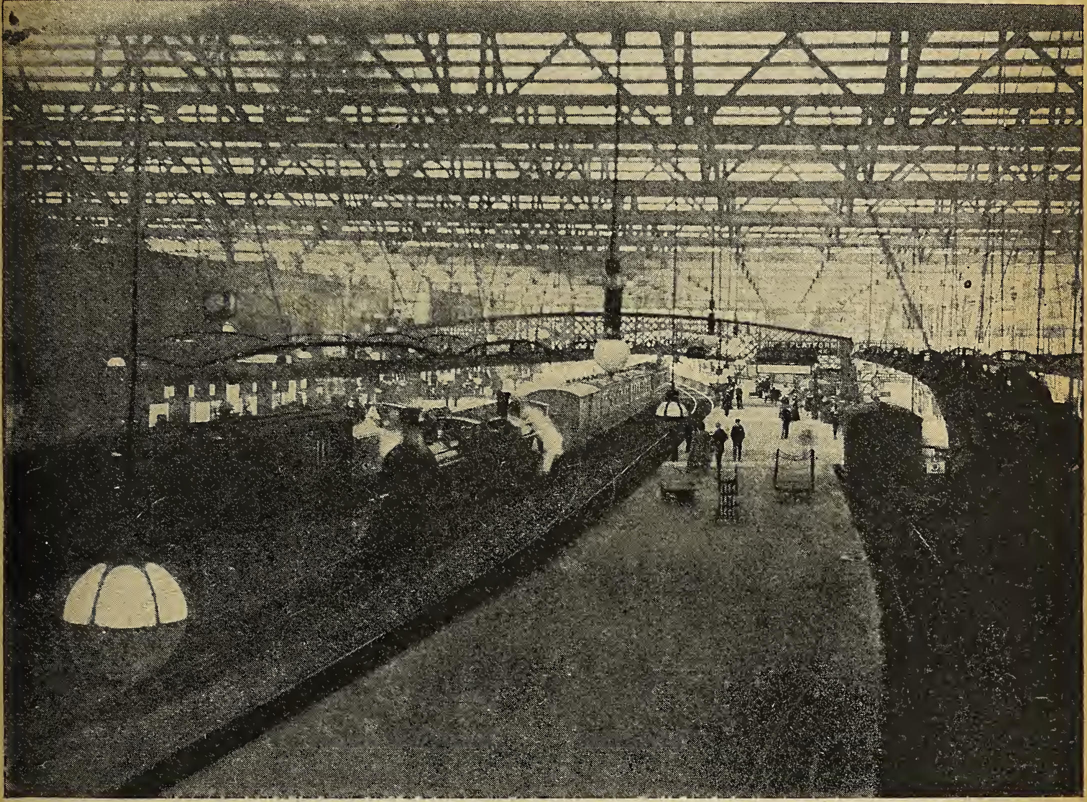


Photo by B. Scott & Son,] *[Carlisle.*

No. 5 (MAIN LINE) PLATFORM, CITADEL STATION, CARLISLE.

vehicles, was in at "time," and none of the rest were more than six minutes late. All the running was done without hitch or accident of any kind, so that the perfection of the arrangements over 300 miles of line was unquestionable. Under the direction of Mr. Haythornthwaite, the superintendent of the Citadel Station, the traffic was worked smoothly through Carlisle, excellent assistance being given by Mr. Killin, the night stationmaster, and the staff of inspectors. It may be of interest to add that under ordinary circumstances, and exclusive of special trains, the number of trains dealt with each week-day at the Citadel Station is as follows: London and North-Western, 61; Caledonian, 45; Midland, 35; Glasgow and South-Western, 32; North British, 34; North-Eastern, 36; Maryport and Carlisle, 16; total, 259. The London and North-Western Company bring thirteen trains to Carlisle, which do not proceed further northwards, while the Caledonian run five trains to Carlisle which end there. Of the sixty-one London and North-Western trains, no fewer than forty-three are expresses, and of these ten run over 150 miles each without a stop. The Caledonian have thirty-five expresses on the list, the Midland twenty-three, the Glasgow and South-Western seventeen, and the North British fifteen."

Photo by B. Scott & Son,] [*Carlisle.*

CIRCULATING AREA, CITADEL STATION, CARLISLE.

The Citadel Station was built by and belongs to the London and North-Western and the Caledonian Railways, which together form the West Coast (Royal Mail) route. When, however, the Midland, the North-Eastern, the North British, and other companies obtained access, it was deemed advisable to transfer the management to a committee, which is composed of four directors of the London and North-Western, and four directors of the Caledonian, elected annually. The station, of course, has existed since the time when the London and North-Western was constructed over Shap Fells, but after one enlargement, in 1861, it was opened in its present form in 1880—three years after the goods relief lines of the London and North-Western, Caledonian, Midland, and Glasgow and South-Western had been successfully constructed round the city. The following particulars of the present staff of the station will be of interest to railwaymen: One secretary, one superintendent, one night stationmaster, seven inspectors, seven foremen, twenty signalmen, eighteen ticket-examiners, four luggage-room attendants, four lavatory attendants, eight ladies' room attendants, eleven shunters, six shacklers, seven policemen, thirty-six porters, four lampmen, two engine-men, ten platelayers, eight painters, joiners, plumbers, etc., one chief booking clerk, nine booking clerks, one chief parcels clerk, and sixteen parcels clerks. There are three platforms and five bays in the station; the total length of the covered area is 750yds., and though the station is "bottle-necked" at both ends, there is ample scope for future development and extensions.

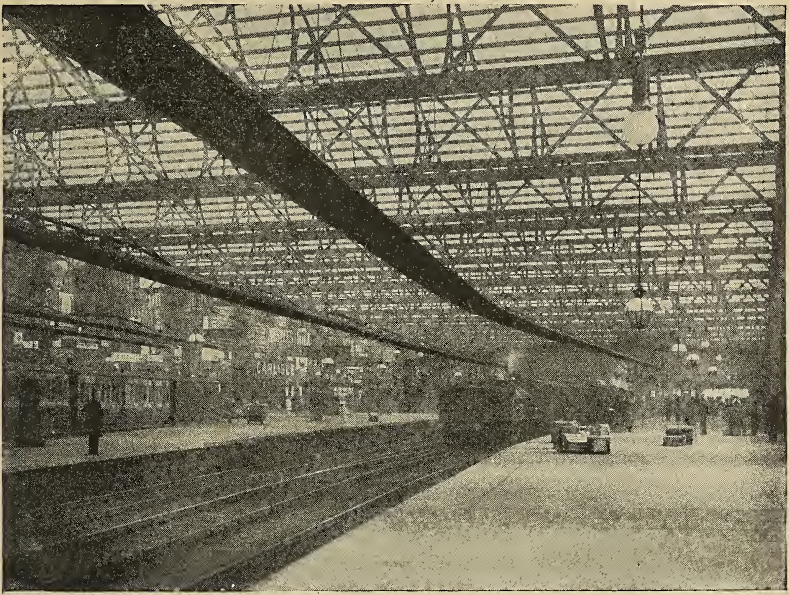


Photo by B. Scott & Son,] *[Carlisle.*

No. 2 PLATFORM, CITADEL STATION, CARLISLE.

Carlisle is situated exactly 299¼ miles from Euston, and the station has been the scene of many exciting incidents connected with the "race" to Edinburgh between the East and West Coast routes in the summer of 1888, and the still more recent "race" to Aberdeen, between the same routes, in July and August, 1895. The results of those struggles were watched with keen interest all over the country, but in the 1895 "race" the enthusiasm of the railwaymen of Carlisle reached a high pitch as each night the performances of the West Coast train from Euston to Aberdeen excelled the previous record. On the final night of the competition the "racer" from Euston actually reached Carlisle 4 hours 36 minutes after leaving the Metropolis, a great crowd being present on the platform at 12.30 (midnight) to raise a hearty cheer for the intrepid driver of the engine, "Hardwicke." The writer of this article was one of those present on that memorable occasion, and, fired with enthusiasm, lost no time in obtaining the official statistics of the run, from which the following analysis was carefully prepared and published in the columns of the "Carlisle Journal," in August, 1895:—

"THE WORLD'S RECORD RAILWAY RUN.

"The following table gives the

official details of the running of the West Coast express from Euston to Aberdeen on the night of August 22nd and morning of August 23rd last. To this train belongs the credit of having established the world's record in all respects—as regards speed, distance run, and time occupied. It left Euston at 8 p.m., reached Crewe at 10.27, leaving at 10.30; passed Preston at 11.16; reached Carlisle at 12.36 a.m., leaving for the North at 12.38; reached Perth at 3.7½, leaving at 3.9½; and drew up at Aberdeen ticket platform at 4.30, leaving there at 4.31; and finally stopped in Aberdeen Station at 4.32. The total time spent on the whole journey in stoppages was only eight minutes, viz.: Three minutes at Crewe for change of engines, two minutes at Carlisle, and two minutes at Perth, also for change of engines, and one minute for collection of tickets at Aberdeen ticket platform. The 299¼ miles to Carlisle were consequently run in 273 minutes, and the whole journey of 540 miles in 504 minutes. The West Coast route includes two very heavy gradients—namely, at Shap Summit and at Beattock Summit, each of which is about 1,000ft. above sea level.

		Distance between Stations.		Time Running.	Speed per Hour.	
	Miles from Euston.	Miles.	Chains.	Minutes.	Miles.	Chains.
London (Euston)	—	—	—	—	—	—
Crewe	158	158	—	147	64	39
Preston ...	209	51	—	46	66	42
Shap Summit...	268	59	—	54	65	44
Penrith ...	281¼	13¼	—	11	72	22
Carlisle ...	299¼	18	—	15	72	—
Lockerbie ...	325	25	63	27	57	24
Beattock ...	339	13	75	12½	66	72
Summit ...	349	10	1	13½	44	40
Symington ...	366¼	17	10	15	68	40
Carstairs ...	372¾	6	53	6	66	50
Holytown ...	389	16	27	15½	63	19
Greenhill ...	405½	16	23	16	61	6
Stirling ...	417	11	48	11	63	22
Perth	450	33	2	33	60	4
Forfar	482½	32	40	29½	66	8
Kinnaber Junction	501¾	19	25	18	64	30
Stonehaven ...	523¾	21	68	19½	67	18
Aberdeen Ticket Platform ...	540	16	12	13½	71	62

Average speed between Euston and Carlisle, 65 miles 69 chains per hour.
Average speed between Carlisle and Aberdeen, 62 miles 69 chains per hour.
Average speed on the whole journey (including stoppages), just over 63¼ miles per hour.
London and North-Western engine, "Adriatic," from London to Crewe, P. Clow, driver.
London and North-Western engine, "Hardwicke," from Crewe to Carlisle, B. Robinson, driver.
Caledonian engine, No. 90, from Carlisle to Perth, A. Crooks, driver.
Caledonian engine, No. 17, from Perth to Aberdeen, John Soutar, driver."

It is interesting to add that a month later—on September 8, 1895 (Sunday)—the train which has run the longest distance in the world without a stoppage reached Carlisle. It was an experimental train, which left Euston that morning, drawn by the London and North-Western engine, "Ionic," and traversed the 299¼ miles to Carlisle without a stop in just under 6 hours. Ben Robinson, of Crewe, who had helped to win the race to Aberdeen, was the driver, and the experiment proved so successful that ever since the London and North-Western Company have run their chief Scotch expresses between London and Carlisle with only one stoppage on the way—at Crewe, which is 158⅛ miles from Euston, and 141⅛ miles from Carlisle.

Carlisle Station is unique, inasmuch as no express train has ever run through it. Each through express has to stop at Carlisle for change of engines, and the difficulty of working the traffic is increased by the varying gradients over the different lines to the city, and the various brakes in use. Three out of the seven companies' trains are fitted with the Westinghouse brake, while the other four use the vacuum brake. Hence, every through West Coast train has to be altered from Westinghouse to vacuum, or *vice versâ*, while the train is standing in the station. The Midland trains have to be divided between the North British and Glasgow and South-Western Railways, and the trains of these two Scottish lines are made into trains for the Midland Railway. Through coaches run from various points on the several systems, that have to be transferred at Carlisle, so that the amount of shunting and marshalling that daily takes place at the Citadel Station is enormous. Numerous improvements have recently been effected at the station, which is fitted throughout with electric light, the installation comprising sixty-three arc lamps and 700 incandescent lamps. The "clock" system of indicators has also been established with success, platforms have been numbered, and other desirable things are now being done.

Photo by B. Scott & Son,] [*Carlisle.*
THE BOOKSTALL, CITADEL STATION, CARLISLE.

This article must not be closed without a reference to the management. Mr. W. Haythornthwaite, the genial superintendent, has won the respect and esteem of all classes since he took over the appointment held by Mr. Jamieson, who retired on pension nearly four years ago, after a service extending over just fifty years. Mr. Haythornthwaite is forty-eight years of age, and was born near Lancaster. He entered the railway service in 1870, and, like his predecessor, Mr. Jamieson, has risen through well-nigh all grades by his perseverance, integrity and tact. For the first four years he worked as a yardman and goods and passenger guard. After that he was, for a similar period, the joint foreman at Tebay for the London and North-Western and the North-Eastern. He spent the next two years at Carnforth as joint inspector for the London and North-Western and the Furness Railways. Mr. Haythornthwaite after this held the appointment of stationmaster at Kendal for three years, at Tebay for two years, and at Carnforth for ten years, the last-named post being for the London and North-Western, Furness and Midland Railways conjointly. In April, 1895, he was transferred to Carlisle as Mr. Jamieson's assistant, and was appointed superintendent when Mr. Jamieson retired, on completing his jubilee, with a present of £200, a pension of £100 a year, and a handsome sum of money subscribed by the public of Carlisle and the country generally. On leaving Carnforth to take up his responsible duties at Carlisle, Mr. William Haythornthwaite was presented, on June 8, 1895, with a purse of gold and an illuminated address from the public and the railway employees of the district. The first three signatures to the address were those of the Earl of Derby, Lord Henry Bentinck, and the Hon. Victor Cavendish, M.P.

Mr. Thomson, the secretary of the Citadel Station Committee, is now in his sixty-third year. He joined the railway service in Carlisle as a telegraph clerk as far back as January, 1852, so that in fourteen months' time he will, like Mr. Jamieson, be able to look back over fifty years of honourable service in the same place. By his assiduity, his patience, and his perseverance, Mr. Thomson rose through many grades of the service until he was appointed secretary to the Citadel Station Committee in 1875. He also holds the secretaryship for the goods relief lines round the city; for the Portpatrick and Wigtownshire Joint Railway since its amalgamation in 1885, the head office of the company being at the Citadel Station; and for the Larne and Stranraer Steamship Company, which also has its head office in Carlisle, Mr. Thomson being registered as the managing owner of the boats.

Thus we end our account of the headquarters of perhaps the biggest railway centre of its kind in the world, for it is computed that the "railway population" of Carlisle is something like 2,000. The London and North-Western Company alone have "stables" for about 100 engines at their Carlisle sheds, together with extensive repairing shops and carriage sheds. The Midland Railway keep no fewer than seventy engines at their sheds at Durran Hill, a mile from Carlisle, while the other railways keep a proportionate number at Kingmoor, the Canal, London Road and Redbank respectively. It is also worthy of mention that many of the Crowned Heads of Europe have seen the Citadel Station, while Her Most Gracious Majesty the Queen has passed through Carlisle regularly four times a year ever since Balmoral became one of the homes of the Sovereign of this realm. When Her Majesty passed through Carlisle from Balmoral to celebrate her Diamond Jubilee in London, in 1897, most elaborate preparations were made on the West Coast route, and Mr. Webbe's great engine, "Queen Empress," from Crewe, which drew the Royal train from Carlisle southward, was painted cream colour, in imitation of the horses used in Her Majesty's State coach. By way of coincidence, the pilot-engine run in front of the Royal train from Carlisle on that occasion was named the "Prince of Wales."

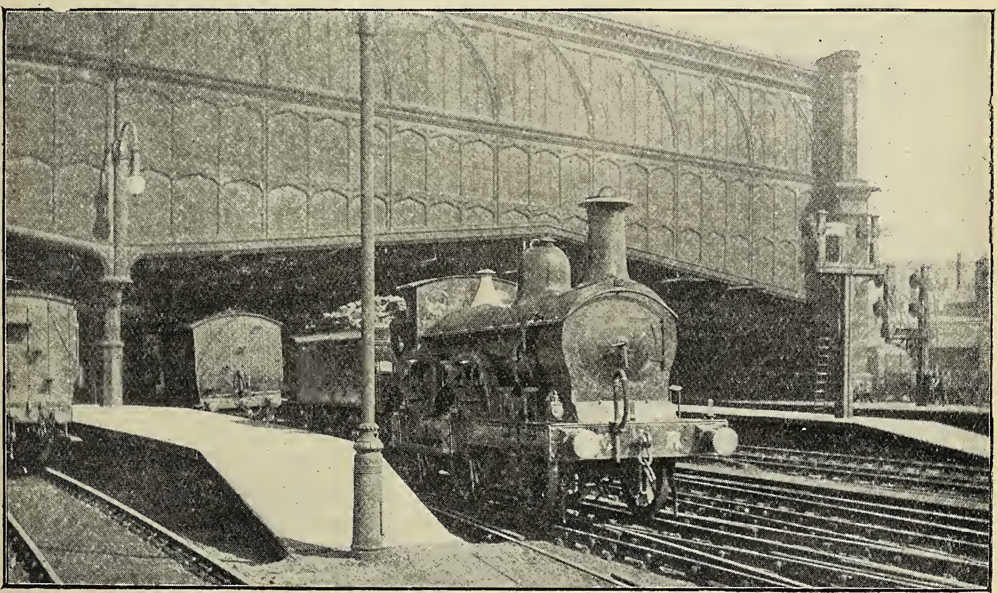
THE RAILWAY MAGAZINE.

NOVEMBER, 1907.

Twenty-Four Hours at Carlisle.

By R. E. Charlewood.

ONLY two important "frontier" stations exist in England, Carlisle and York. At York, the important traffic consists of the East Coast expresses, passing from the Great Northern Railway to the North-Eastern Railway and *vice versa*, while the other railways' trains, which enter York from the south, for the most part terminate there, except for a few through services to Scarboro' and Newcastle. But at Carlisle there are two groups of important traffic: the West Coast Scotch expresses, passing from the London and North-Western Railway to the Caledonian Railway, and the Midland-Scotch trains, handed over by the Midland Railway to their northern allies, the Glasgow and South-Western Railway and the North British Railway. In addition to the local services—fortunately not very frequent—of all the above five railways, there are the trains of the Maryport and Carlisle Railway and the North-Eastern Railway to deal with. For these two latter, Carlisle is virtually a terminal station, though through carriages run regularly each night between Newcastle and Stranraer, and there was at one time a through vehicle running between Glasgow, Central station, and Newcastle, transferred from the Caledonian Railway's 2 p.m. from Glasgow to the North-Eastern Railway at Carlisle.



CARLISLE STATION FROM THE SOUTH.

To accommodate all this traffic, the space at Carlisle station is very limited. It will be seen from the plan on page 376 that there are only three main line platform faces, and room for five trains in the various bays. Fortunately, the main platforms are long enough to admit of two trains being dealt with simultaneously. The station is worked on the "Permissive" system, consequently the platform at which a train is dealt with is apt to vary with circumstances and the running of that particular train; but, as a general rule, it may be stated that No. 5 is used for up West Coast and a few up Scottish-Midland expresses, No. 2 for Midland-Scottish expresses, up and down, and No. 1 for down West Coast traffic. The Maryport and Carlisle bay at the south end of the island platform is used exclusively for that railway's trains, which occasionally appear at No. 2 platform as well; Nos. 1 and 2 bays are devoted to North-Eastern Railway traffic, and Midland Railway and London and North-Western Railway local departures; and Nos. 3 and 4 bays to the local traffic of the three Scottish Railways. If any important train has to be diverted from its usual platform, notice to that effect is usually written up on the train-telegraph boards. These are situated on Nos. 2 and 5 platforms, and as they record the running of all the principal trains, up and down, they afford interesting and, sometimes, amusing reading. London and North-Western Railway trains are reported from Lancaster, Tebay, and Penrith; Midland Railway trains from Hellifield and Appleby; Caledonian Railway trains from Carstairs, Beattock, and Lockerbie; North British Railway from Galashiels and Riccarton; and Glasgow and South-Western Railway from Kilmarnock, Dumfries, and Annan. Carlisle is probably one of the very few stations where three figures are occasionally needed to record the number of minutes certain trains are running late. Below is an extract from the telegraph board as it sometimes appears in August:—

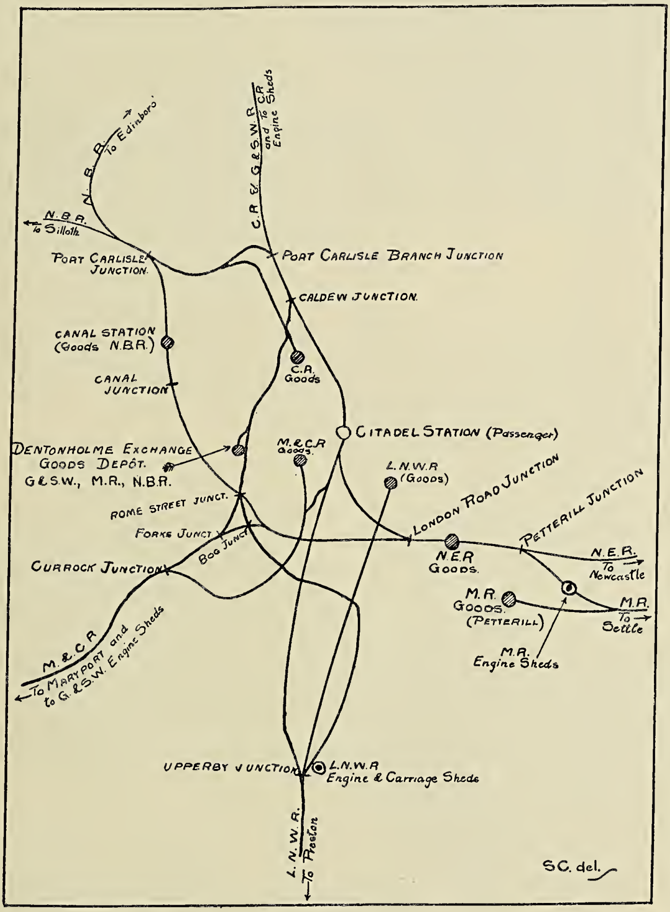
Time due at Carlisle.	Minutes late at		
	Lancaster.	Tebay.	Penrith.
1.12 1st portion	*23* early	*9* early	*5* early
1.12 2nd portion	*1* early	2	6
1.35	8	14	20
1.45	13	36	40
2.12	*8* early	21	22
2.22	13	35	34
2.32	9	39	37
2.39	9	38	40
2.55	12	29	30
3.5	13	46	46

Before describing a day's work at the station, some particulars as to the staff may be of interest. Carlisle station is managed by a committee of directors of the London and North-Western and Caledonian Railways, elected annually; and the number of the staff employed in and about the station, including the Superintendent (Mr. Haythornthwaite) and the night station master, is just over 150. This includes 16 ticket-examiners (the tickets of all through trains are examined and, in some cases, collected at Carlisle), 16 shunters, 18 signalmen and train recorder boys, and 7 station police. The traffic within the station limits is regulated by four signal boxes: No. 4 at the north end, number 4A in the station on the island platform, number 5 at the south end, and number 6, controlling Maryport and Carlisle trains. The refreshment rooms, which are situated on each platform, are privately owned and under the management of the Carlisle Hotel Company, which also conducts the refreshment rooms at Penrith, Oxenholme, and Whitehaven, and some years ago, before dining saloons were so common as they are now, the day express from Perth to London (Euston) stopped at Carlisle for passengers to lunch.

Apart from the difficulty of dealing with the passenger traffic, a large number of light engines have to pass through the station to and from the various engine-sheds, and a certain amount of empty stock has to be accommodated in the station for strengthening purposes and to form outgoing locals. The London and North-Western Railway carriage and locomotive sheds are situated towards Upperby, a mile south of the station; the locomotive depots of the Caledonian and North British Railways are north of the city; the Midland and North-Eastern Railways, whose trains diverge to the east at the southern end of the platform, have their sheds below Petterill Bridge, a mile south; and the Glasgow and South-Western Railway sheds are awkwardly situated to the south-west, down the line of the Maryport and Carlisle Railway. Every through train changes engines at Carlisle, and great difficulty is sometimes experienced in working the light engines in and out of the station.

Goods traffic is, fortunately, diverted outside the station limits, though fish trains and, occasionally, specials of empty stock pass through the platforms, and in the ordinary course of things, little marshalling has to be done in the case of West Coast trains. Carlisle has none of Preston's intricate marshalling problems to solve, but with the Midland-Scottish trains too much work has to be performed, in spite of the tendency to delegate this to Hellifield on the down journey and to run up trains from Glasgow and Edinburgh independently through to Leeds. With trains often running 'out of course,' difficulty and delay is inevitable, and a perusal of the time-table proves that important trains descend upon Carlisle in such awkward groups that, in view of the time occupied by each passenger train with change of engine, brake alteration, and examination of tickets, additional platform accommodation is required.

The number of passenger trains entering Carlisle from the south in August, 1907, was 72, and from the north 53. Departures numbered 68 southwards, and 55 to the north. This takes no account of excursions (regular or special), trains running on certain days in the week only, or duplications. The latter add enormously to the work, for during the summer Anglo-Scottish expresses are constantly in two, three, or even four portions, and there is a continuous procession of trains all night long.

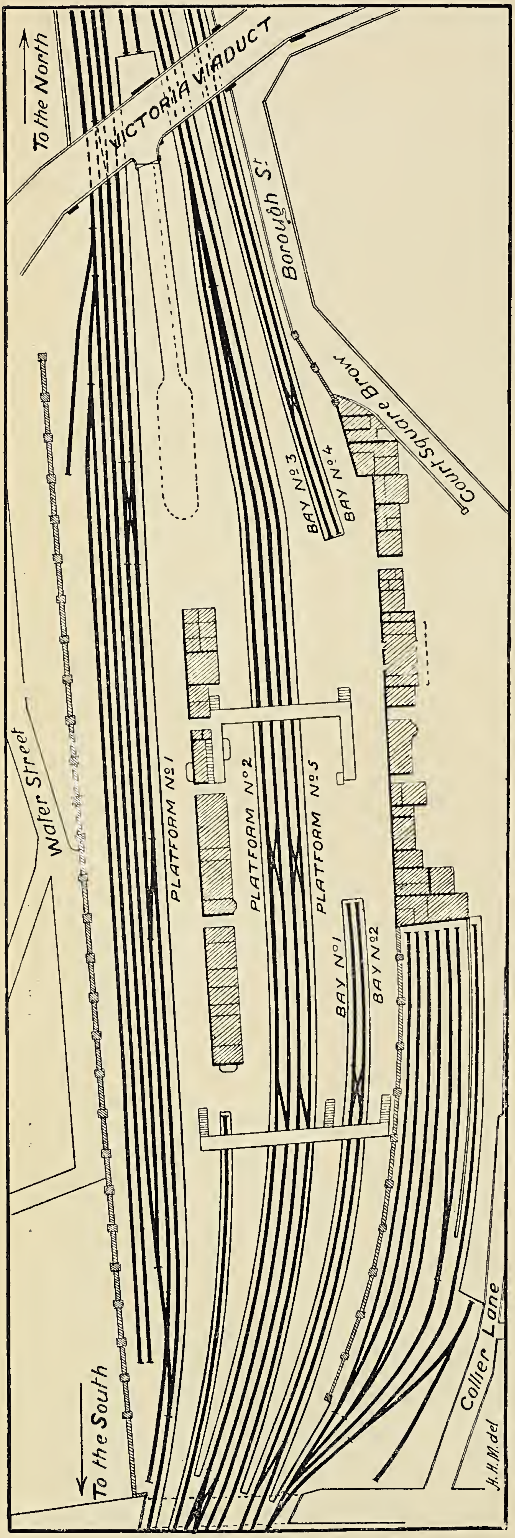


MAP OF RAILWAYS AROUND CARLISLE.

As there is only one "clear" period of any length during the twenty-four hours at Carlisle, from 9.25 to 11.25 p.m., I propose to commence my description of the "day's work" at the latter hour, which marks the beginning of the night traffic.

The first train to appear is the West Coast 9.5 p.m. from Glasgow, due to arrive at 11.28 and leave at 11.33. It has lost much of its importance as a night express, but still takes a considerable roadside traffic and has a through carriage from Glasgow to Birmingham. It is followed on No. 5 platform by the 8.10 p.m. from Perth, 12 to 12.10 a.m. at Carlisle, still an important train, heavy and unpunctual, though the 8 p.m. from Aberdeen takes the bulk of the sleeping saloon traffic. Meantime, No. 2 is occupied by the first of the Scottish-Midland trains, due in at 12.15 a.m. from Glasgow, St. Enoch, and 12.20 from Edinburgh, Waverley. The two portions are united and form the Midland Railway 12.25 a.m. to Leeds and St. Pancras.

From 12.30 to 3 a.m. is the night rush period. First comes the Stranraer train, due at 12.42 a.m., with portions for Euston, St. Pancras, and Newcastle, the last named vehicles leaving at 1.5, the only non-stop train from Carlisle to Newcastle. The Euston carriages are attached to the 10.45 p.m. from Glasgow Central (10.50 from Edinburgh, Princes Street) which arrives on No. 5 at 12.55 and leaves at 1 for Crewe, Willesden, and Euston. This train frequently comprises as many as four West Coast 65 ft. sleeping saloons, and takes the cream of the Glasgow-London night traffic Occasionally, through its heavy loading or owing to the unpunctual arrival of the

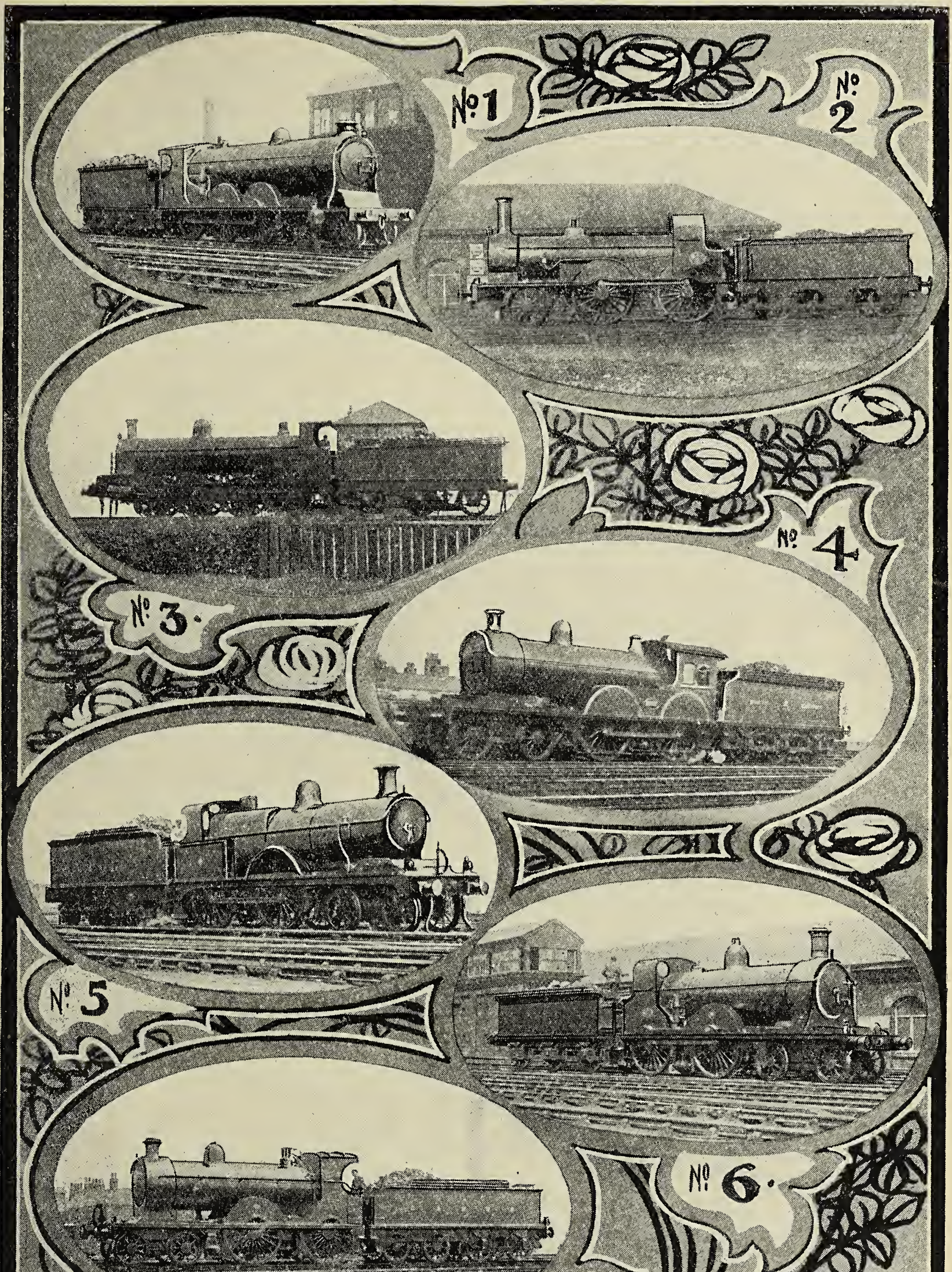


PLAN OF THE CITADEL STATION, CARLISLE.

Stranraer contingent, the latter vehicles have to go forward separately to London, or be attached to one of the following trains, for after the 1 a.m. leaves, No. 5 platform receives in turn the sleeping saloon express from the Highland Railway and Oban, 1.30 to 1.35 at Carlisle, and the 8 p.m. from Aberdeen, due in at 1.42 and out at 1.50. These two trains leave at Carlisle a motley assortment of vehicles, from fish trucks to sleeping composites, to form a train for Preston, Liverpool, and Manchester, which leaves at 2 a.m. (nominally) from the North-Eastern bay. This train is in its own small way a marshalling puzzle, and presents a ludicrous appearance. It is often unpunctual, and, owing to duplications and late running of the London trains, sometimes leaves Carlisle after 3 a.m.

This finishes the West Coast up traffic and leaves No. 5 clear till 6.30 a.m., unless its space is required for Scottish-Midland traffic, now in full swing on No. 2. First comes the 10.15 p.m. from Edinburgh, Waverley, due in Carlisle at 12.50 p.m.; it should pick up the Midland portion of the Stranraer train, and leave at 1.10 a.m. for Leeds, there to be joined by the 11 p.m. from Glasgow, St. Enoch, to St. Pancras, which passes through Carlisle at 1.30 to 1.35 a.m. Then comes the 11.30 p.m. from Waverley, a somewhat unpunctual train, due in at 1.45 and out for St. Pancras at 1.52 a.m., while vehicles from both the Glasgow and Edinburgh trains have to be detached at Carlisle and formed into a 2.2 a.m. for Hellifield and the Lancashire and Yorkshire Railway. As a matter of fact, 2.30 or even 3 a.m. may find No. 2 platform still struggling to despatch the Midland Railway expresses.

But before this hour, a procession of down trains has begun to stream through No. 1 platform. The first arrival, at 1.12, is a London and North-Western Railway train from Manchester and Liverpool to the north, which goes forward over Caledonian Railway territory at 1.20. Next should come the 7.15 p.m. from St. Pancras, the Midland Railway's cherished Highland express, due in at 1.25 and forward to Edinburgh (Waverley) at 1.30. It is a fast but far from a heavy train, not always punctual, and so at times has to follow the 7.45 p.m. from Euston to the Highland Railway, due to arrive at 1.35 and leave at 1.40, non-stop (so far as passengers are concerned) to Perth. Then comes the 8 p.m. from Euston, 2.12 in and 2.17 out, to Stirling, Perth, and Aberdeen, and the 8.10 p.m. from Euston



LOCOMOTIVES AT CARLISLE.

Engines of the Seven Railways working into Carlisle.

1. Caledonian.
2. Maryport and Carlisle.
3. London & North-Western.
4. North-Eastern.
5. Midland.
6. North British.
7. Glasgow & South-Western.

to Stranraer, which arrives at 2.30 a.m. Both these last two trains are frequently divided, and the 8 p.m.'s Oban portion may have to be sent to Carlisle on the 8.10, so that it is nothing unusual to see six trains of = 20 apiece arrive between 1.30 and 2.45 a.m. from the London and North-Western Railway alone.

At 2.40 a.m. appears the Stranraer train from the North-Eastern Railway (non-stop from Newcastle at 1.10 a.m.), and at 2.45 the Midland Railway's 8.30 p.m. from St. Pancras may be looked for on No. 2 platform. The combined Stranraer train of the three English railways leaves at 3.10, usually in two portions, as there is a portion from St. Pancras to Glasgow attached as far as Dumfries (discontinued since September), and one from Carlisle to Ayr. No. 1 has, in the meantime, dealt with the famous West Coast postal train, due at 2.48, and away at 2.54 over the Caledonian Railway. This train is booked from its last stop, Carnforth, $62\frac{3}{4}$ miles distant, in 70 minutes, and the postal authorities re-man the train at Carlisle. The stream of West Coast expresses flows steadily on with the 9 p.m. from Euston to Glasgow, which makes a *detour* by Birmingham and so gets ahead of the slower 8.50 p.m., due in at 3.50 and out at 3.58, and the laggard 8.50 p.m. to Edinburgh and Perth is at Carlisle from 4.15 to 4.22 a.m. Then comes the interval occupied on Saturday mornings by excursions to the north, while No. 2 deals with the Midland Railway 9.30 p.m. from St. Pancras, divided at Leeds, the first (Edinburgh) portion being due in Carlisle at 4.15 and out at 4.20, and the second (Glasgow) at 4.30 and out at 4.35. The last night trains are the 11.35 p.m. from Euston to Edinburgh and Aberdeen, which arrives at 5.30 and leaves at 5.35 a.m.; the 11.50 p.m. from Euston to Glasgow, 5.40 to 5.46 a.m.; and the Midland Railway 12 midnight from St. Pancras, which arrives on No. 2 at 6.23, and leaves for Glasgow at 6.28, with the addition of a breakfast car. The 10 p.m. from Euston arrives at 6, after transferring its mails and sprinkling of passengers into the 11.35 at Oxenholme.

Already the day service is in full swing. Scottish locals start early, and a Caledonian Railway local has already left at 5.55. At 6 a.m. a North-Eastern Railway local starts for Haltwhistle, followed by a Newcastle semi-fast at 6.30; at 6.30, too, the first London and North-Western Railway train leaves No. 5, a slow to Preston, and the Maryport and Carlisle Railway's day begins with the departure of the 6.40 a.m. to Maryport, at which hour also starts a North British Railway local to Longtown, while the first Glasgow and South-Western Railway train leaves at 7, slow to Dumfries and thence semi-fast to Glasgow. Scotchmen—and the inhabitants of Carlisle have many Scotch characteristics—are early travellers, and a fair number of passengers are always astir to catch the 5.46 and 6.28 a.m. to the north, so that by 7 a.m. the station presents its usual day appearance.

MIDLAND RAILWAY LONDON EXPRESS LEAVING CARLISLE.

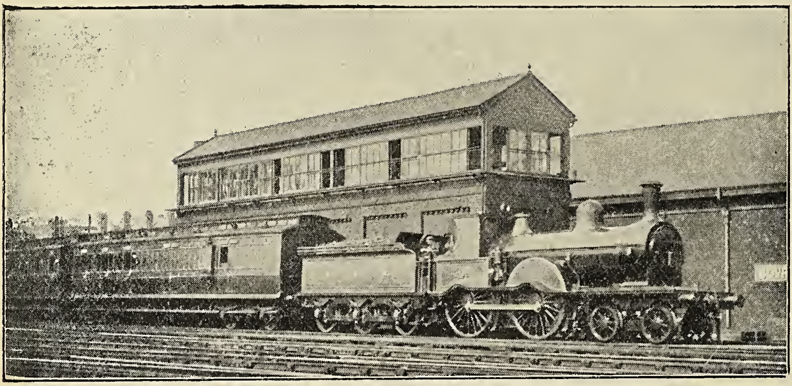
The first important departure to the south is the London and North-Western Railway 8.30 a.m., an old-established train, ultimately reaching Euston at 4.20 p.m. In connection with it, locals arrive from the north at 8.12, 8.15, 8.18, and (Silloth branch train) 8.20, and at 8.13 from Maryport, and 8.21 from the Newcastle branch. The Midland Railway sends out a slow at 8.35 a.m. to Hellifield, 5 p.m. at St. Pancras, and its first local arrives from Appleby at 8.53. On the London and North-Western Railway, a slow is due in from Penrith at 8.20, and the 12 midnight from Euston may be expected at 8.52, trains in connection leaving at 9.10 (Maryport), 9.30 (Dumfries), 9 (Edinburgh; Waverley), and 9.15 (Silloth). The Caledonian Railway's connection leaves at 9.5, except on Mondays, when its departure time is 9.35, to suit the 9.30 arrival time of a semi-fast from Lancaster, on Mondays and Wednesdays only. A local starts southwards to Preston at 9.55 a.m., after the arrival at 9.50 of a train from Maryport; a fast to Newcastle departs at 10.8, a Maryport local at 10.45, and a Midland Railway train at 10.55 to Hawes Junction, where it transfers passengers into the first of the up Scottish-Midland expresses. At 11.5 No. 2 had in 1906 to receive an express from Leeds and the Lancashire and Yorkshire Railway to Scotland, due out to Edinburgh at 11.10 and Glasgow at 11.15, bringing a breakfast car from Manchester to be detached at Carlisle; and at 11.20 a semi-fast (9.2 a.m. from Preston) is due on No. 1 from the London and North-Western Railway.

At 11.45 the mid-day rush commences with the arrival on No. 2 of the North British Railway 9.35 a.m. from Edinburgh, which picks up dining-cars at Carlisle and leaves at 11.50 for Leeds and St. Pancras. It is followed, on the same platform, by the 9.20 a.m. from Glasgow (St. Enoch), 11.55 to 12 at Carlisle. By this time, a line of London and North-Western Railway engines has appeared to take charge of the up West Coast trains, the first of which, the 10.5 a.m. from Edinburgh, arrives at 12.5 on No. 5 platform and leaves at 12.10, non-stop to Crewe, dropping at Carlisle a portion for Liverpool and Manchester. Then comes the Glasgow to Euston train, 12.12 to 12.18, and then the Glasgow to Manchester and Liverpool, which arrives at 12.32, attaches the vehicles from Edinburgh, and leaves for Preston at 12.40. The Perth express is due at 12.48, departing at 12.58, and owing to its unpunctuality in summer, is frequently preceded by a 'Relief' to Preston. No. 2 platform is occupied meanwhile by the 5.10 a.m. from St. Pancras, due at 12.23, which leaves 12.28 for Glasgow (St. Enoch), and by the express from the Lancashire and Yorkshire Railway, *via* Hellifield, due at 12.40. This train goes forward to Glasgow at 12.47, and for Edinburgh (non-stop) at 12.45, with through carriages from the 12.23, while a semi-fast for Edinburgh follows at 1. In 1906 one train only was advertised, due to arrive at 12.42, though it was usually in two portions, and timed to leave at 12.47 (Glasgow) and 12.50 (Edinburgh), the former picking up the luncheon-car left at Carlisle by the Midland Railway train, arriving at 11.5. On No. 1 the London and North-Western Railway "Newspaper" is due at 12.33. Its Glasgow and Edinburgh vehicles are taken forward by the Caledonian Railway at 12.40, the Perth portion (strengthened at Carlisle) following twelve minutes later, and a second train from Liverpool (Lime Street) and Preston arrives at 1.11 and proceeds north at 1.22. The group of expresses terminates with the arrival at 1.6 of the 10.30 a.m. from Edinburgh (North British Railway) on No. 2 or No. 5, as circumstances and punctuality dictate, which leaves at 1.14 for Leeds and thence non-stop to London, and at 1.25 and 1.35 on No. 2 of the 11 and 11.10 a.m. from Glasgow, St. Enoch. The first leaves at 1.30 for St. Pancras, and the second at 1.42 p.m. for Manchester and Liverpool, attaching at Carlisle a portion off the 10.30 a.m. from Edinburgh.

INTERIOR OF LONDON AND NORTH-WESTERN RAILWAY'S CARRIAGE SHED AT CARLISLE.

A period of comparative quiet follows till three o'clock, broken only by the usual procession of local arrivals and departures, by the departure at 1.45 from the bay of a London and North-Western Railway semi-fast to Preston, and by the passing on No. 5 (2.13 to 2.20) of the 12 noon from Glasgow to Euston (with through carriages from Edinburgh and Oban), which reaches Euston at 8.30 p.m., running non-stop from Warrington to Willesden, 176½ miles. The up platform then has peace till 3.45, except for south-bound excursions on Saturdays, but not so Nos. 1 and 2.

The first train to arrive on No. 1 is the 7.10 a.m. from Euston, familiarly termed the "Mail" in the north, which is due at 3.5, terminates at Carlisle, and has to be split up, its Post Office van being deposited in the Maryport Bay to continue its journey north at 8.42 p.m. Little enough time is allowed for the work, as hard behind the "Mail" follows the 11.15 a.m. from Birmingham, due at 3.27, and taken forward by the Caledonian Railway at 3.32, after leaving a luncheon-car at Carlisle. Next on No. 1 comes the Euston to Edinburgh train, 3.48 to 3.53 at Carlisle, and the Euston to Glasgow, which arrives at 3.59 and proceeds north at 4.0; until the summer of 1907, this train detached a Bristol to Aberdeen carriage to wait for the 10.5 from Euston, due to arrive at 4.22 and leave for Aberdeen at 4.30, conveying a Caledonian Railway 'slip' from Carlisle to Lockerbie. In the meantime, No. 3 has accommodated the Midland-Scottish expresses, the 9.30 a.m. from St. Pancras to Edinburgh, booked to arrive at 3.45 and leave at 3.50, and the 9.45 a.m. to Glasgow, due to stop at Carlisle from 4 to 4.5. The 9.30 and 9.45 usually pick up at Hellifield portions from Manchester and Liverpool for Edinburgh and Glasgow, but in the busiest season, and on Saturdays in summer, these are 'specialled' forward to Carlisle and Glasgow, independently of (though not always in advance of) the London trains. The Stranraer daylight service leaves at 4.40 p.m. for Dumfries, connecting with the 10.5 from Euston.



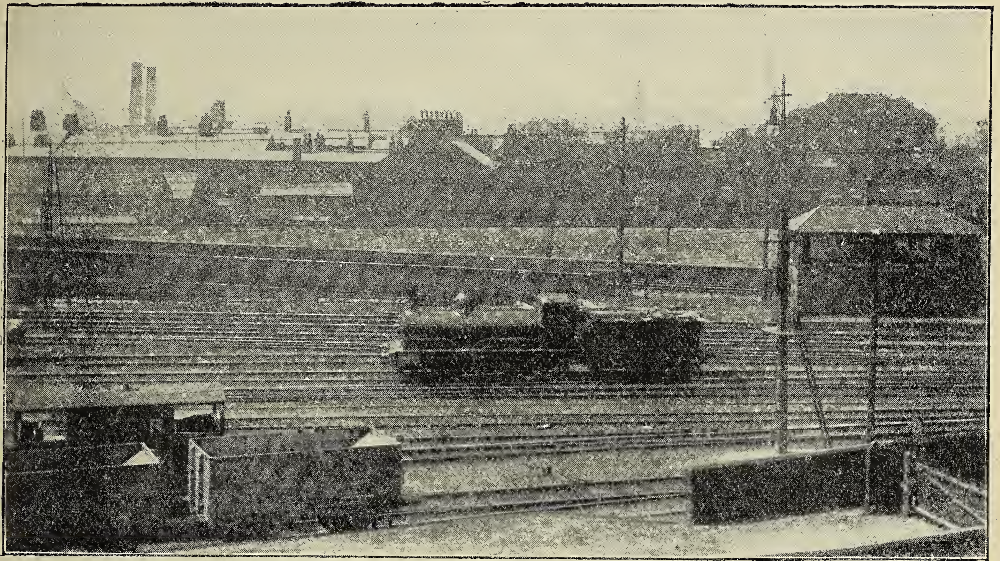
NORTH-EASTERN RAILWAY TRAIN LEAVING CARLISLE.

So much for the afternoon's work on Nos. 1 and 2, but No. 5 is equally busy. The 1.30 p.m. from Glasgow, St. Enoch, appears at 3.50, and is taken forward by the Midland Railway at 3.55; a local to Hellifield following from the Bay at 4. At 4.5 the 2 p.m. from Edinburgh, Princes Street, is due, leaving for Preston and Euston at 4.12, while the Glasgow corridor is due at 4.15, leaving at 4.22. The portion from Aberdeen and Perth to Euston should join the Edinburgh train at Symington, but in summer frequently forms a 'special' following the Glasgow train through Carlisle any time before or after 5 p.m., as the arrangements of the Highland Railway and the condition of Perth station may dictate. An equally uncertain train, the 2.20 p.m. from Waverley, comes in on No. 2 at 4.40, and leaves for St. Pancras at 4.45 p.m.

From 4.50 to 9.20 there are a number of important expresses coming and going, with two bad crowds at six and eight o'clock. No. 1 receives a semi-fast from Preston at 5.20 p.m., terminating at Carlisle; at 5.30 on Saturdays only the Midland Railway third-class luncheon-car excursion to Scotland is due on No. 2, leaving at 5.35 (Edinburgh) and 5.40 (Glasgow). The ordinary 11.30 a.m. from St. Pancras to Glasgow follows, arriving at 5.50 and proceeding north at 5.55, and the 11.40 a.m. for Edinburgh, 6.7 to 6.12 at Carlisle, thus securing a continuous occupation of No. 2 platform. The 11.30 a.m. from Euston should be on No. 1 platform from 5.43 to 5.48, and is followed out by a Caledonian Railway semi-fast at 6 to Glasgow, and No. 5 is fully occupied by Caledonian Railway arrivals at 5.14 and 5.40, forming and connecting with the London and North-Western Railway

5.45 p.m. out from the bay, and by arrivals at 5.30 (North British Railway) and 5.45 (Glasgow and South-Western Railway), which, after no little marshalling, compose the Midland Railway 6.2 p.m. to Leeds. Next comes the West Coast 4.30 p.m. from Glasgow (4.15 p.m. from Edinburgh) to Manchester and Liverpool, due in at 6.54 and out at 7, a four-year-old train, already very heavy in summer; and except for the usual stream of locals, amongst them two Midland Railway arrivals at 7 and 7.40, the station is quiet till eight o'clock.

Then follows the last clash of our twenty-four hours at Carlisle, the 1.30 p.m. from St. Pancras and 2 p.m. from Euston, due on No. 1 platform at 7.55 and 8.8. The latter train was originally due at 8.16, a far more convenient time, for if the Midland Railway's express arrives before 8.5, the West Coast train must inevitably be delayed. The St. Pancras train has to divide at Carlisle, leaving at 8 for Glasgow and 8.4 for Edinburgh, after which the West Coast train can be admitted, and is taken forward by the Caledonian Railway at 8.13; a second train (from Liverpool and Manchester arriving at 8.37 and leaving at 8.42, with a Lockerbie 'slip' attached in rear. None of these trains can be relegated to No. 2, where there is a Glasgow and South-Western Railway arrival at 8.3 and a North British Railway train due at 8.37, respectively, forming the 8.22 and 8.45 p.m. Midland Railway departures, the Glasgow train leaving behind at Carlisle a tea-car, which returns to St. Enoch as a breakfast-car at 6.28 a.m. next day. No. 5 accommodates a West Coast fish train at 8.15, and the up "Limited Mail"—4.4 p.m. from Perth and 5.55 from Glasgow—from 8.35 to 8.42, the last train to pass through being the West Coast up Postal, which leaves for Euston at 9.22.



ENTRANCE TO THE GOODS YARD AT CARLISLE.

With such a stream of important expresses passing throughout the twenty-four hours, the difficulty of altering the times of any of the chief trains is apparent, and any delays that occur in working the traffic through are plainly excusable. Many of the local arrival and departure trains have been omitted in the above account, especially those of the North-Eastern Railway, which are dealt with entirely at the bay on No. 5, and consists of 16 in and 17 out during the twenty-four hours.

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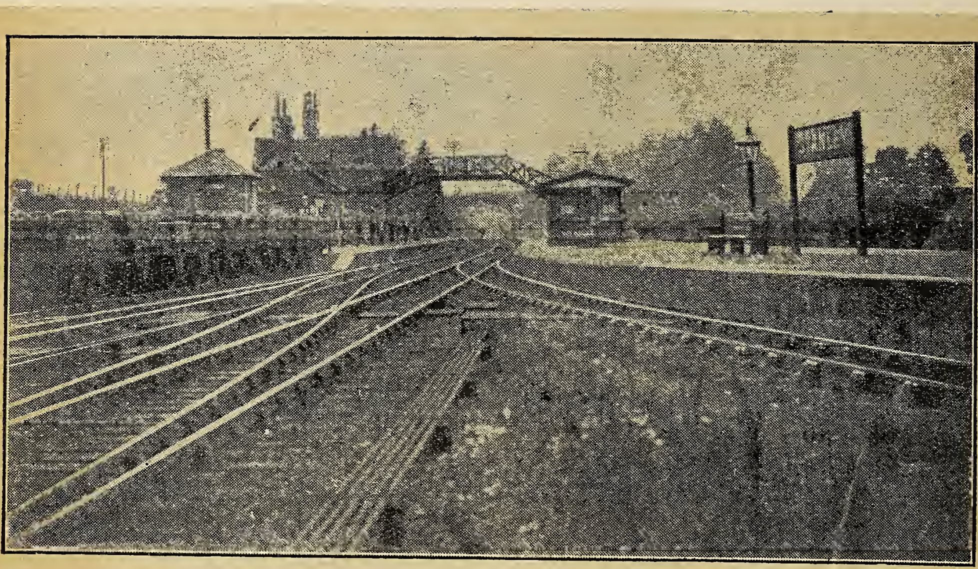


STANLEY JUNCTION, WHERE THE HIGHLAND RAILWAY JOINS THE CALEDONIAN RAILWAY, AND HAS RUNNING POWERS OVER IT TO PERTH.

Caledonian Railway to left. Note the lengthened platform at right for use of the Highland Railway's trains.

Photo] OLD KILPATRICK STATION, CALEDONIAN RAILWAY. [*E. H. Anderson.*

A Clydeside station, in a district where competition has duplicated railway facilities.

A NIGHT SCENE AT CARLISLE.
Liverpool and Manchester Express ready to start.

Notable Railway Stations and their Traffic.

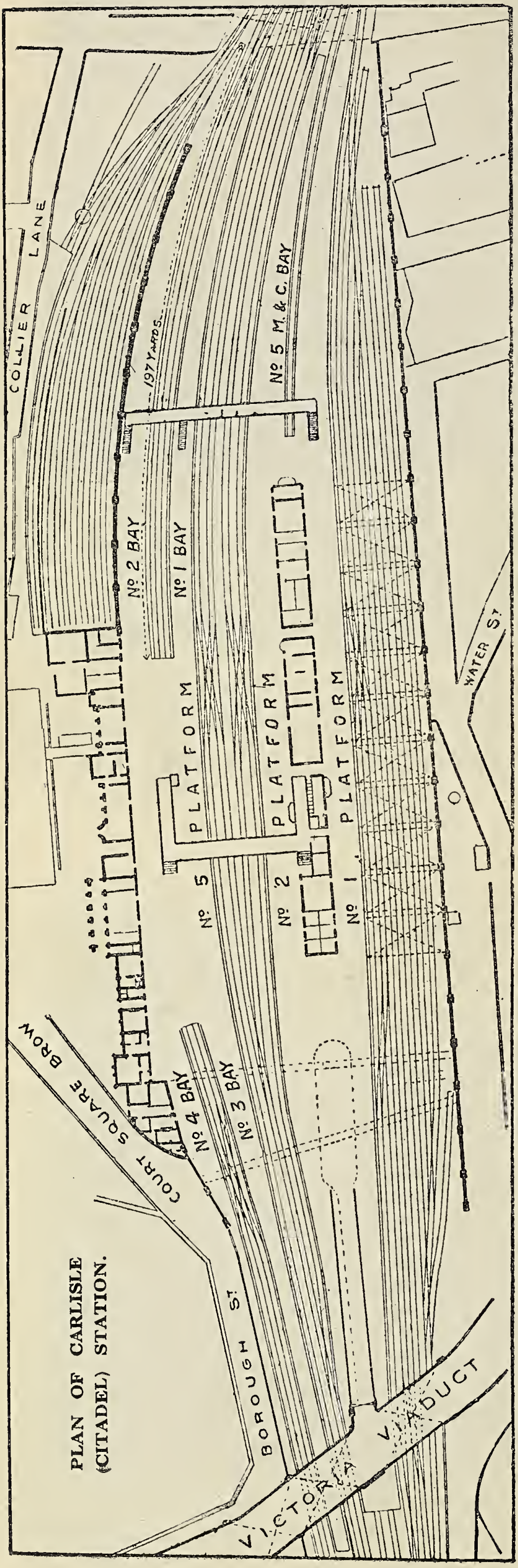
CARLISLE (CITADEL), LONDON MIDLAND AND SCOTTISH RAILWAY.

By E. M. SANDERS.

AS a border city, guarding the western approach to Scotland, Carlisle has always occupied a strategic position, and although the seven railway companies previously using it are now reduced to two, it provides all the interest of a great railway junction, Carlisle being, in every way, a centre of great importance from the railway point of view. Hence, although it has on more than one occasion received attention in the pages of the RAILWAY MAGAZINE, there is every justification for consideration again.

The original station was built by the London and North Western and Caledonian Railways, and consisted of one through platform and two bays. Other companies converging upon Carlisle each had their separate stations, which were for the most part where their present goods depôts are now situated. The Newcastle and Carlisle Railway, now part of the London and North Eastern Railway, was the first to enter Carlisle, and this railway was soon followed by the Maryport and Carlisle, these companies having their own stations at London Road and Crown Street respectively.

In the days before railways ran into Carlisle, there was a canal from the city to Port Carlisle, eleven miles to the west on the Solway Firth, and it was along the bed of this canal that the Carlisle and Silloth Railway Company elected to lay their line. The waterway at this time was not by any means paying its way, so when the water had been drained out, the railway was laid to its Carlisle terminus at the canal basin to the west of the city. When the North British Railway entered Carlisle, they took over the Carlisle and Silloth, with the result that the locomotive and carriage sheds of the North British Railway are still at the canal basin. This accounts for the fact that the North British



PLAN OF CARLISLE (CITADEL) STATION.

diverges from the Caledonian and Glasgow and South Western lines to the west, the North British "Waverley" route crossing over the Caledonian main line about three-quarters of a mile to the north.

The gradual admission of the other companies to the Citadel station caused great congestion, as all the goods traffic was as yet passing through it, and so in 1873 the station was entirely rebuilt, and a new line to the west constructed to meet the requirements of the rapidly increasing goods traffic. The station now covers an area of ten acres, and has eight platform roads, which together measure 2,284 yards in length. The longest platform is No. 5, which is 454 yards long, which length is often required, as two long express trains frequently have to be dealt with at the same platform. The total area of the platforms is $2\frac{1}{4}$ acres.

Although its two ends face, in reality, roughly north-west and south-east, it will be convenient to consider the station as facing north and south, and its two sides as the east and west sides. The station is situated in a convenient position in the centre of the town, facing on to the spacious Court Square, through which most of the tramway routes of the town pass. On the east side of the square, with covered communication from the station, is the County and Station Hotel, which, though standing on land owned by the Citadel Station Managing Committee, is let to an independent company.

The Booking Hall is entered by one of three arches, but to the right of these there is a separate arch through which luggage may pass. On each side of the Booking Hall are the booking windows of the respective companies and sections. The Maryport and Carlisle had its booking office on platform 2, where also are booking offices for use in connection with trains starting from the west side of the station.

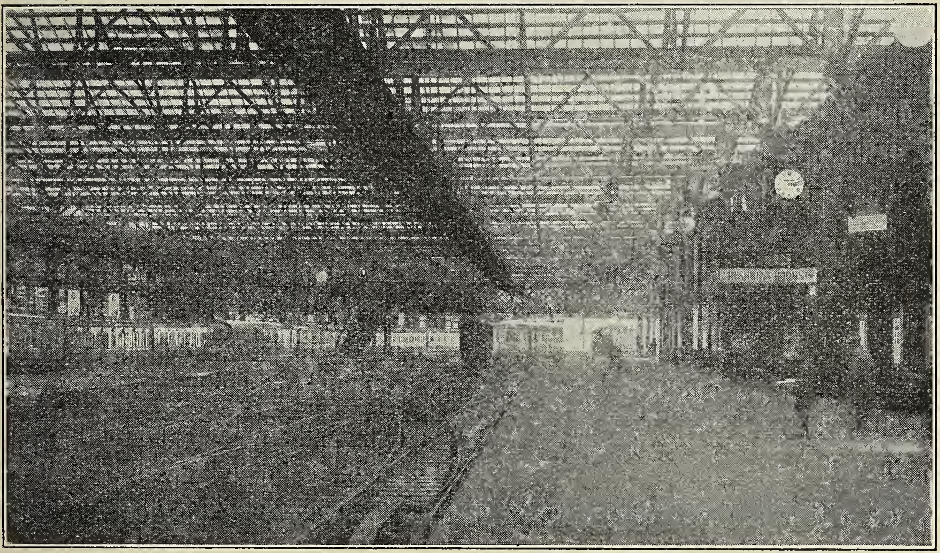
Beyond the arch leading from the Booking Hall is a large circulating area, on which are various fruit and tobacco stalls. Placed also in conspicuous positions are indicators showing the times and platforms of departing trains, and also a board indicating the times, etc., of excursions and any other special trains. As no vehicular traffic enters the station on the east side, this circulating area is entirely given up to passenger and luggage movements, and so is free from all overcrowding.

On the left of the entrance, extending up to No. 2 bay, as seen on the plan, reproduced on the opposite page, are first and third-class waiting rooms, refreshment rooms and gentlemen's and ladies' lavatories. Beyond this, also, is a lamp room. On the right, a waiting room, the station master's offices, a parcels' office, a large cloak room and a telegraph office. Commencing opposite to, and continuing beyond the left luggage office, is No. 4 bay, which is extended for some distance under the viaduct which spans the northern end of the station. Communication with platforms 1 and 2 and No. 5 bay is afforded by a wide and substantial bridge, which is approached on the southern side by an inclined way, up which bicycles and perambulators may be wheeled, and on the other by steps. A little to the south of this bridge is a large luggage lift, by means of which access is given to a subway below the level of the rails. By this subway luggage is transported from one side of the station to the other, and near the lifts are facilities for labelling luggage, etc.

Crossing the bridge, we notice that between platforms 2 and 5 there are two running roads, narrowing into one at the northern end. Those at the southern end are used by engines waiting to take on expresses, and by coaches and dining cars ready to be attached to trains. There are crossovers from these lines to the platform roads at the end and also in the centre of the station. At the bottom of the slope on the other side of the bridge are boards indicating the punctuality or otherwise of the trains on the various lines. These are also to be found in a prominent position on platform 5.

To the south of the bridge is a block of buildings extending down the platform to No. 5 bay, comprising first and third-class buffets, waiting-rooms, a left-luggage office, a parcels office, a bookstall facing on to platform 1, and the Maryport and Carlisle booking office. To the north is a bookstall facing on to platform 2, gentlemen's and ladies' lavatories, a telegraph office, a large luggage room, main line booking offices, and a parcels post office. There is also a booking office on platform 1. Between the telegraph office and these booking offices are the lifts corresponding to those on platform 5. Beyond platform 1 are five roads, used for storing and marshalling passenger trains, crossovers being provided from the platform line to the nearest of these at the northern and southern ends of the station.

As has already been mentioned, at the



CARLISLE (CITADEL) STATION, FROM MAIN FOOTBRIDGE, LOOKING NORTH.

northern end of the station there is a viaduct bearing one tramway line and considerable traffic, which crosses all the lines of railway, and the platform which comprises the platform lines Nos. 1 and 2 and No. 5 bay is connected by an inclined roadway with this viaduct. On the platform there is sufficient room provided for vehicles to turn round and also for three or four vehicles to stand. Near the southern end of the station there is another bridge, not so wide as the main one and approached only by steps, spanning Nos. 1, 2 and 5 bays, as well as the main platforms.

CARLISLE (CITADEL) STATION, LOOKING NORTH.

The station roof, which covers six and a quarter acres, is carried by twenty-six deep lattice girders, about 40 ft. apart, these supporting a series of cantilever beams. The whole is glazed with Mellows glazing. No part of the station is therefore at all dark. At the south end of the station, on the left, is the London and North Western goods depôt, and on the right the Maryport and Carlisle goods yards. On the east side of this end of the station are the North Eastern lines, over which Midland trains run as far as Durran Hill Junction. In the centre, rising considerably, in order to cross over the goods lines from the Newcastle line, is the London and North Western main line, and on the right, curving sharply round to the west, is the Maryport and Carlisle section. It may be noticed here that the Glasgow and South Western locomotive sheds are situated to the south of the station, on the Maryport and Carlisle line.

Ignoring for the moment changes produced by grouping, let us now consider the uses to which the various platforms are put. No. 1 bay is used for Midland local traffic, though London and North Western and North Eastern trains work into it when not otherwise in use. Bay No. 2 is given up almost entirely to North Eastern traffic, and is used for both arriving and departing trains. The traffic of No. 3 bay is divided fairly equally between the three Scottish lines, but No. 4 is used almost exclusively for the Silloth traffic of the North British, excursion trains on this line frequently being of considerable length, hence the extension of the platform under the viaduct.

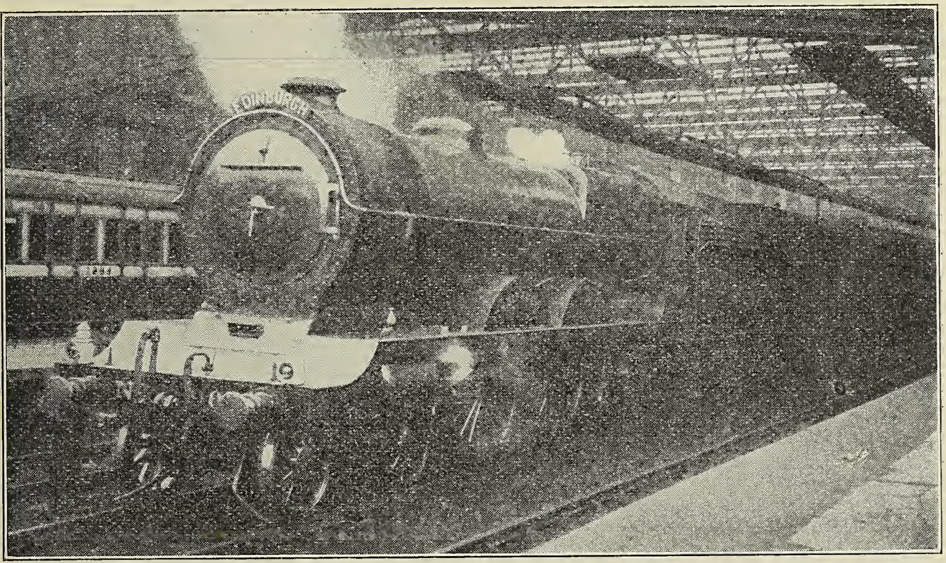
The numbering of the main platforms is, at first, rather confusing. Nos. 1 and 2 are on each side of the island platform on the west of the station. The two running roads are then assumed to be Nos. 3 and 4, thus making the other main platform No. 5. This platform is the up West Coast through platform. Here all the West Coast expresses from the north are dealt with, as well as several up London and North Western expresses which start from Carlisle.

Crossing the bridge, platform 2 is reached. This is the up and down through Midland, North British and Glasgow and South Western platform. Here nearly all the expresses to and from Edinburgh and Glasgow, *via* the Midland route, are dealt with, and as both the up and down expresses use the platform, it is often the scene of great animation. Several Glasgow and South Western and North British trains also use this platform when not in use for through traffic. No. 5 bay is used solely for Maryport and Carlisle traffic ; as this is only a single line bay, the engines of arriving trains must remain in the platform till the train is unloaded and ready to back out. At all the other bays, crossovers are provided to allow for the exit of the engine if required for other purposes. No. 1 is the down through West Coast platform at which all the down West Coast expresses are dealt with, also several down London and North Western trains which terminate at Carlisle.

A feature about passenger train working at the Citadel station is that the arrivals and departures of the chief Anglo-Scottish expresses fall naturally into three groups, and it is therefore at these times that the station is at its busiest. The first period falls between the hours of 12 noon and 2 p.m. ; between these hours four up West Coast Anglo-Scottish expresses are dealt with at platform 5, three being for Euston and one for Liverpool and Manchester. From platform 2, three up Midland Scotch expresses and one down express are despatched, whilst two down West Coast trains are due at platform 1. The second group of expresses commence at 3.45 p.m., and are dealt with at the platforms in much the same way as the first group.

A writer once remarked that Carlisle station was busier at midnight than at midday. It is shortly after midnight that the third and largest group begins to besiege the Citadel station ; at the up West Coast platform four sleeping car expresses arrive and depart, and similarly at the Midland platform three up expresses are dealt with. As soon as these up "sleepers" have left, the earliest down trains begin to arrive, commencing with the 7.30 p.m. from Euston, reaching Carlisle at 2.14 a.m. These continue throughout the early hours of the morning, the last sleeping car arrival being the 11.40 p.m. from Euston, due Carlisle 6.40 a.m. During the tourist season some of these trains are duplicated and additional ones run.

The fact that a railway builds up its



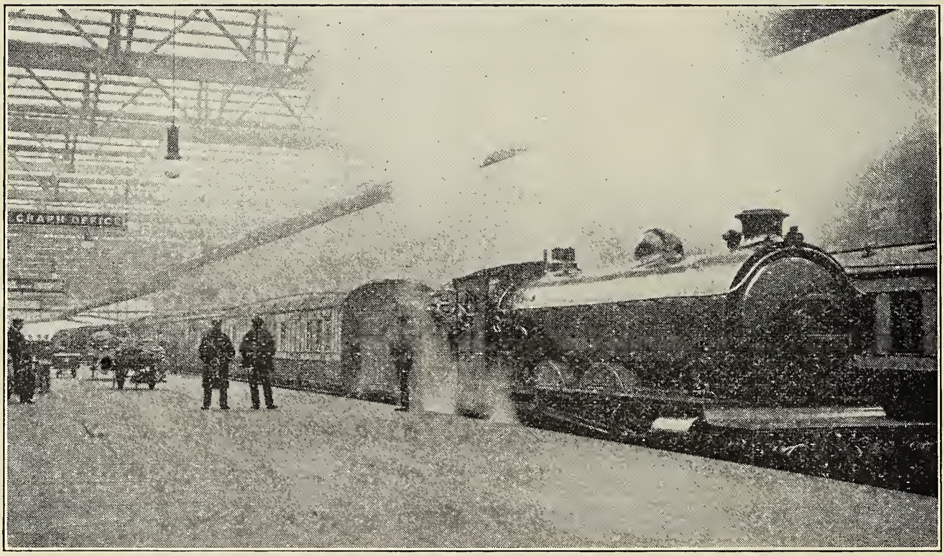
LONDON & NORTH EASTERN (NORTH BRITISH) 4-4-2 LOCOMOTIVE WAITING TO TAKE ON EDINBURGH EXPRESS.

local traffic by the service it gives is well demonstrated at Carlisle. No one who had regular business in Carlisle ever thought of living more than two miles at the most from the centre of the city. The North Eastern and Maryport and Carlisle came to Carlisle, and with increased accommodation on entering the Citadel station at once provided good local services. To-day it is on these lines that most local traffic enters and leaves Carlisle station. It is also noticeable that these two lines have a local service on Sundays.

The North Eastern has frequent express trains, stopping at only four or five stations, between Carlisle and Newcastle; and during the summer months there is a through train to and from Silloth, using the North British line between Silloth and Carlisle. There is also in each direction a midnight express running non-stop between the two cities, partly for conveying through coaches to and from Stranraer, but chiefly for the accommodation of the milk traffic between Cumberland and Newcastle, and for mails.

A service which forms an important part of passenger train working at Carlisle station is the Liverpool and Manchester to Glasgow trains. Though these are not always recognised as forming a considerable part of the Anglo-Scottish expresses, nevertheless they provide an excellent service. Restaurant car expresses give arrivals at Carlisle from the south at 12.45 and 3.25 p.m., from which trains passengers may in both cases change at Carlisle into the express following for Perth, Aberdeen, etc.; the Liverpool and Manchester proceeding to Edinburgh and Glasgow. In the up direction similar arrangements exist, there being a sleeping saloon for Liverpool (Lime Street) on the 11.10 p.m. from Glasgow.

In pre-war days excursions and cheap tickets received much attention by the various railway companies at Carlisle, and these facilities are beginning once more to grow to their pre-war dimensions. Silloth, on the North British line, is a favourite resort for excursionists, and on any summer Saturday several excursions may be run to that place alone. On the North Eastern line, Wetheral (4½ miles), How Mill (7½ miles), and Brampton Junction (11 miles from Carlisle), attract a great deal of pleasure traffic, so much so that the out Sunday evening train, and the corresponding return train, are duplicated as far as Wetheral in the summer months. Keswick and Penrith (for Ullswater) provide abundant pleasure traffic for the North Western route, there being a through coach from Keswick to Carlisle, *via* Cockermouth and the Maryport and Carlisle line twice daily.



WEST COAST EXPRESS AT No. 1 PLATFORM.

Signals and points at Carlisle are controlled by three main boxes, viz., No. 5 Box (114 levers), No. 4 Box (56 levers), and No. 4A (40 levers). As will be seen, No. 5 is the largest box and controls the south junction. Here, during the busy times, one movement of points and signals is made, on an average, each minute. No. 4A is in the station itself, and controls all signals and points within the station, whilst No. 4 is at the northern junction, controlling movements at this end of the station.

Mr. NICOL CAMPBELL, M.B.E.,
Station Superintendent,
Carlisle (Citadel) Station
Joint Committee.

Although the Citadel station is on the whole well planned and easy to work, there are one or two details in the lay-out of the lines approaching the station that are at times inclined to be rather inconvenient. For example, up and down Midland expresses have to cross the path of up West Coast expresses, which frequently leads to delays when one or other of the trains is late. The accommodation for North Eastern trains is rather limited now, with the addition of several new trains, sometimes causing delays outside the station owing to the platform lines being occupied. The reader will by this time have gathered that the station is rather small in proportion to the traffic with which it has to deal, and this is certainly the case.

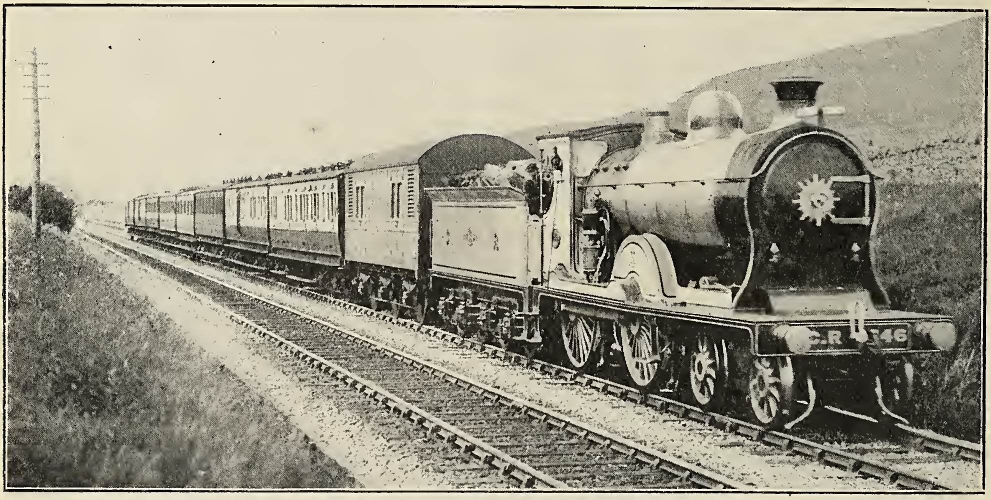
Carlisle station being essentially a joint station, since the trains of what were seven companies use it, is managed by the Citadel Station Joint Committee. The station is at present under the able superintendency of Mr. Nicol Campbell, M.B.E., whose offices are in the station. Mr. Robert M. Thomson is secretary to the Citadel Station and Carlisle Goods Traffic Committees.

Mr. ROBERT M. THOMSON,
Secretary,
Carlisle (Citadel) Station and
Carlisle Goods Traffic Committees.

Whether the grouping of seven companies into two will materially affect the train services at Carlisle remains to be seen, but one thing is certain, that so long as railways in Great Britain exist as they are to-day, Carlisle must necessarily be one of the chief connecting links between English and Scottish services, and will always rank as one of the most important exchange and traffic centres in the British Isles.

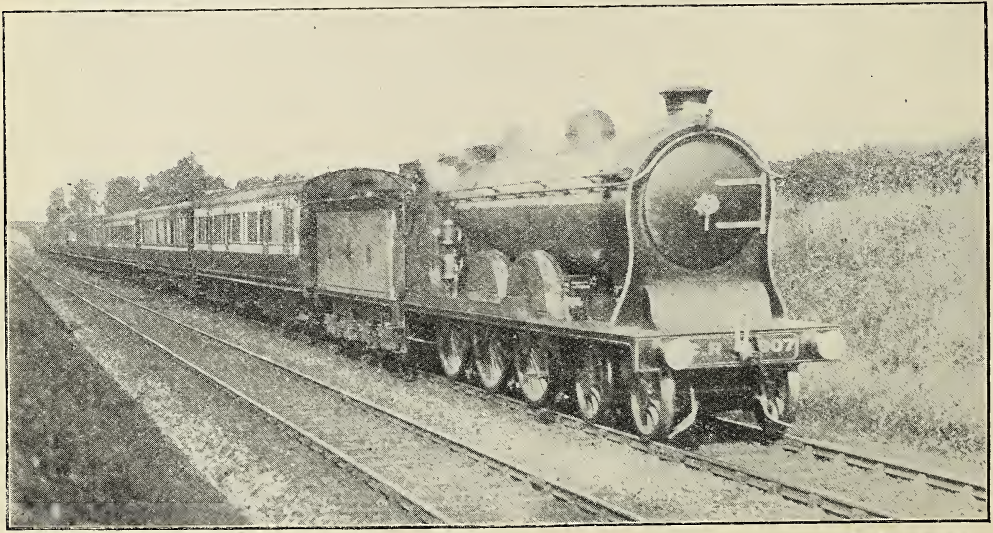
Mr. Nicol Campbell, M.B.E., Superintendent at Carlisle, entered Caledonian service at Edinburgh as a porter, passing through various grades until appointed assistant stationmaster at Rutherglen on the opening of the underground lines in Glasgow. He was then transferred to Greenock (Central) in the same capacity, afterwards becoming chief inspector, night stationmaster, and (14 years ago) Superintendent to the Carlisle (Citadel) Station Committee. Mr. Campbell was awarded the M.B.E. in 1919 for war services rendered during the period when the traffic associated with Gretna Munition Factory, and the tremendous troop and other traffic passing through Carlisle, added so greatly to his responsibilities.

Mr. Robert M. Thomson has held the positions of Secretary to the Citadel Station Committee and Carlisle Goods Traffic Committee since 1907, while in 1916 he was also appointed Secretary to the Carlisle Joint Control for the regulation of goods traffic of the seven companies then associated at Carlisle. Mr. Thomson entered railway service at Carlisle in 1883 as a clerk in the booking office. In 1885 he was transferred to the secretary's office of the Portpatrick & Wigtownshire Joint Railway and Larne & Stranraer Steamship Committee, returning to Carlisle in 1907 as above mentioned.



Photo] CALEDONIAN RAILWAY. [*Mr. H. Gordon Tidey.*

West Coast (Edinburgh-Liverpool) Express ascending Beattock Bank: 4-4-0 Locomotive No. 746.



Photo] [*F. E. Mackay.*

CALEDONIAN RAILWAY:

10 a.m. Glasgow-London Express. 4-6-0 locomotive No. 907 (now fitted with Schmidt superheater).

Carlisle—A Station of Changes.

By O. S. NOCK, A.C.G.I., B.Sc.

IN one of his inimitable travel books H. V. Morton writes: "Carlisle is, to me, always the sound of milk cans being bowled along an echoing platform at about 2 a.m.

"It is one of those places at which you always awaken in a sleeping car and peer out through a misty night into the grotesque coldness of a great station in the still hours, watching, with a numb sense of unreality, porters bowling shining churns one after the other, or pitching boxes and baskets of merchandise from truck to truck.

"Carlisle! The very name seems to hold the sound of those long hammers with which men hit carriage wheels in the still hours of the morning."

Thus, even to a non-railway mind, Carlisle assumes a character that is all its own, and it is not difficult to explain the great attraction it has always had for railway enthusiasts.

Of the two Border stations, only Carlisle enjoyed the distinction of being a frontier point in every way, and in this respect it was unique among the stations of Great Britain. The pleasant anticipations aroused by the prospect of crossing the Border reach their climax on arrival at Carlisle, and to this, in pre-grouping days, the very distinctive locomotive types of the Scottish lines, and especially those of the Caledonian and North British, contributed in no small measure.

To the Caledonian engines one was instantly attracted by their wonderful blue livery, but that these handsome engines were capable of thrilling feats on the road was also known far and wide. Then the North British, with their strongly contrasting but equally distinctive dark brown colour, had their fine names with which so much of Scotland's history and romance is associated.

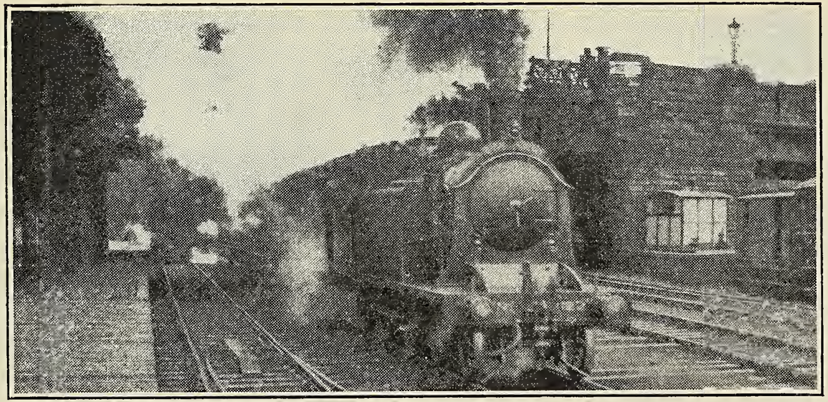
Some years ago some verses appeared in *Punch* entitled "Engines," and those relative to Carlisle caught the spirit of the place admirably:—

"Berwick's the border on the east, Carlisle upon the west,
But the new teams buckle to the load and bear it with the best;
And it's on through Liddesdale they race, o'er Lammermoor they speed,
By Ettrick, Esk and Teviotdale, by Annan, Nith and Tweed,
Where it's collar-work the long, long day and hills are hills indeed!

"Then hey for 'Borderer,' 'Waverley,' 'Dunedin,' 'Holyrood,'
'Bonnie Dundee' and 'Thane of Fife' and all that titan brood;
'Rob Roy,' 'Guy Mannering,' 'Claverhouse,' full throttle and away,
To link the Solway with the Clyde, to join up Tyne and Tay."

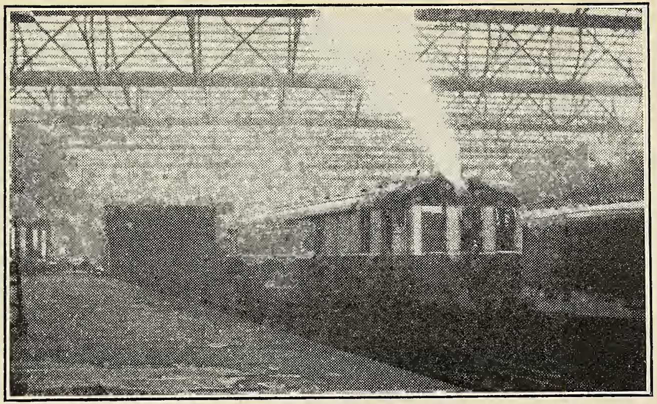
Then, of course, there would be the more familiar North Westerns and Midlands, to say nothing of the North Eastern, and the Maryport & Carlisle, and at the really busy periods, for example 12 noon till 1.30 p.m., the station would present a most bewildering assortment of engines, and with six different colours the effect could be truly kaleidoscopic; add to this all the glamour of traffic-working and engine-changing, and the fascination of the place can be well imagined.

But truly "the old order changeth," and in eight years there have been sweeping changes indeed. The most important has been the loss of its one-time unique characteristic—that of a frontier station. Many West Coast expresses now pass through without changing engines, and several of the most important trains do not even call. All the year round the up "Night Scot" does Glasgow to Crewe non-stop, and during the summer the "Royal Highlander" makes a mighty run from Crewe to Perth, so that H. V. Morton's milk cans and wheel-tappers no longer disturb the slumbers of travellers to the Highlands. During the past



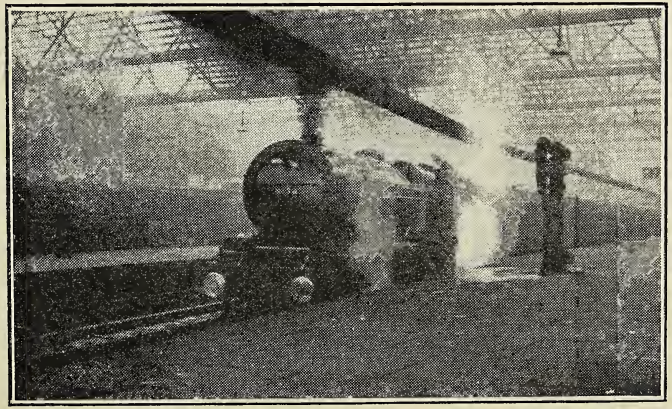
[*D. S. Barrie.*

L.N.E.R. LANGHOLM TRAIN LEAVING CARLISLE CITADEL STATION.
N.B. 4-4-2T No. 9122.



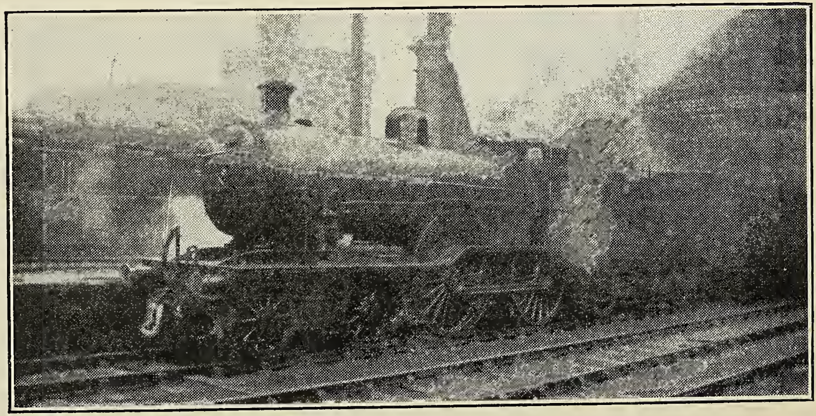
[*O. S. Nock.*

SENTINEL STEAM RAIL CAR "NETTLE" ON L.N.E.R. CARLISLE-LANGHOLM SERVICE.



[*O. S. Nock.*

L.M.S.R. EXPRESS FOR GLASGOW LEAVING No. 2 PLATFORM AT CARLISLE.
"Royal Scot" 4-6-0 No. 6155 *The Lancer.*



[*O. S. Nock.*

G.N. SUPERHEATER 4-4-0 No. 3057 WORKING CARLISLE-SILLOTH SERVICE, N.B. SECTION, L.N.E.R.

summer a Midland Division express has regularly passed Carlisle without stopping, on Saturdays, but this train, nominally booked non-stop from Hellifield to Annan, actually called at Kingmoor sheds to change engines; but, all the same, the procedure is significant.

Some developments in the realm of locomotive power would be expected in a period of eight years, but, actually, only three entirely new express types have made their appearance, and two of these are on the L.N.E.R. Waverley route. Here, the Gresley " Pacifics " have taken over all the hardest duties which formerly were worked by the North British " Atlantics," and by their introduction a good deal of piloting has been avoided. The " Atlantics " now take turns with the 3-cylinder 4-4-0's of the " Shire " class on the lighter duties. It is in connection with the working of the " Pacifics " that the strangest development of all has taken place, whereby a London & North Western engine regularly hands over its train to one of Great Northern design! The " Thames-Forth express " arrives from Leeds hauled by a " Claughton," and at Carlisle a " Pacific " takes charge for the run to Waverley.

On the L.M.S. there has been a species of " General Post " of locomotives; the crack engines of one line, on being superseded, have appeared on another to displace the engines of that route, which, in their turn, have moved " one down." Thus the L. & N.W. " Claughtons," displaced from the West Coast route by the " Royal Scots," have come into their own on the Midland. The compounds, which have very nearly disappeared from the Leeds route, have appeared in large numbers on the Caledonian and Glasgow & South Western to the complete discomfiture of the natives. The original Glasgow & South Western engines, in fact, have almost entirely vanished; at first, some of the Manson 4-6-0's were to be seen on the Stranraer and other secondary trains, but now they seem to have been ousted by the Caledonian 4-4-0's!

Grouping, too, has robbed the station of those gay colour schemes by reducing the number to three, of which black is somewhat predominant.

But perhaps the most melancholy locomotive happenings have been the scrapping of the ten Class 4 Midland 4-4-0's of the " 990 " class, which bore the brunt of the Midland Scottish express work for so many years, and the reappearance of the London & North Western " George the Fifth " class 4-4-0's on the Maryport route! When it is remembered how these comparatively small engines handled the West Coast expresses in pre-war days with loads not much less than the " Royal Scots " take to-day, their present duties seem little short of tragic.

To return to the traffic working, it may be that even now things are only in a transition stage, and that before long we shall see the Midland Scottish expresses worked through from Leeds to Glasgow without change of engine. Possibly, the only obstacles in the way are the weight restrictions over the Leeds-Carlisle section, which prevent the use of the " Royal Scot " class engines which have proved so successful in these long workings.

Needless to say, the already instituted Crewe-Glasgow locomotive workings and the arrangements whereby certain expresses change engines at Kingmoor or Upperby Bridge sheds, have greatly improved traffic working in the station. Not only has it been possible to cut station-time allowances, but a considerable reduction in light engine movements to and from the various sheds has been effected, such economy being of great value at the peak periods.

Despite all this, there is still no station where so great a variety of engines can be seen or where the traffic working presents more features of interest, and the following amazing assortment of engines, observed on a Saturday in the height of the summer, all in the station at once, about 1.15 p.m., will bear this out. There were three " Royal Scots " (two L. & N.W. and one G. & S.W.), three Midland compounds (one L. & N.W., one Caledonian and one G. & S.W.), a " Claughton " (Midland division), a rebuilt " Claughton " (L. & N.W.), two L. & Y. 4-cylinder 4-6-0's (L. & N.W. section), a new standard class 2 4-4-0 (G. & S.W. section), a L. & N.W. 19-inch mixed traffic 4-6-0, a Caledonian Pickersgill 2-cylinder 4-6-0 and a Pickergill 4-4-0, both, strange to say, Caledonian section, and a Midland Class 2 superheater rebuilt 4-4-0, these representing the L.M.S. To represent the L.N.E.R., there were a North Eastern Class "Q" superheater 4-4-0, a North British "Atlantic" and a Great Northern "Super Pacific."

In addition to these, the L. & N.W. 4-6-0's of the "Prince of Wales" class, the new L.N.E.R. "Shires," the North British "Scott" class 4-4-0's, superheated and otherwise, Midland Class 3 4-4-0's, the L. & N.W. "George the Fifths" and "Precursors" and, most interesting of all, several of the rapidly vanishing "Jumbos," complete an extraordinary list of regular visitors to this still most fascinating station.

Photo.] **CALEDONIAN RAILWAY.** [*E. A. Gurney-Smith.*

Up mail train from Aberdeen passing Portlethen. 4-4-0 locomotive, No. 897.

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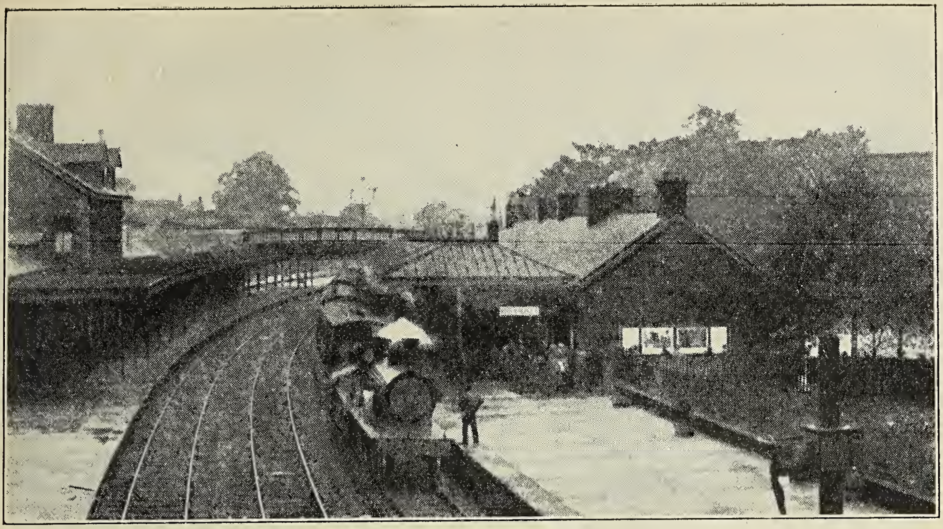


Photo.] [*J. F. Gairns.*

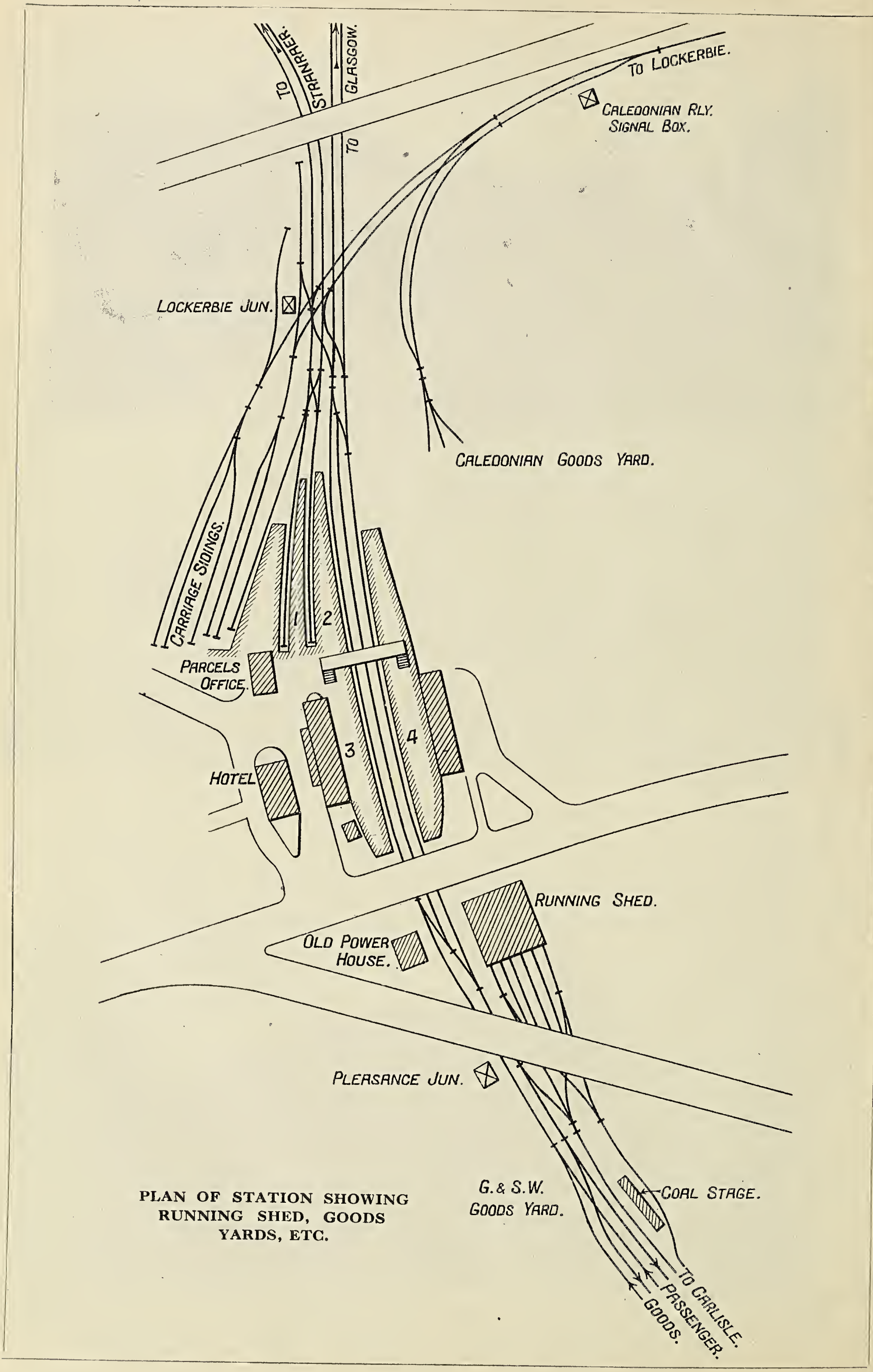
GENERAL VIEW OF STATION.

Dumfries as a Railway Centre.

By J. ALAN RANNIE, M.A. (Oxon.).

THOUGH it contains only 17,000 inhabitants, Dumfries is the largest town of an extensive district in the south-west of Scotland, and the centre of a prosperous agricultural and residential area. It is also by no means unpicturesque in itself, and the beautiful scenery surrounding it, together with the interesting ruins of abbeys and castles within a few miles, attract a considerable number of tourists, especially during the summer months. It is a railway centre of very considerable importance, being the first important station north of the border on the Glasgow and South Western section of the London, Midland and Scottish Railway, and the junction of several branch lines, one of which is an important link in the communications between Great Britain and Ireland. This is the line to Stranraer, which connects with the " short sea route " to Larne and so to Belfast. Dumfries station is, in fact, sometimes referred to as the " Junction between England, Scotland and Ireland."

Travelling towards Dumfries from Carlisle there are several objects of interest to be observed en route. As far as Gretna Junction (8½ miles) the line formerly belonged to the Caledonian Railway, the Glasgow and South Western having running powers and its trains not calling at the intermediate stations of Rockcliffe and Floriston. Whilst passing the engine sheds at Kingmoor, we may notice that Glasgow and South Western engines are now accommodated there as well as their Caledonian sisters, whereas they formerly used a shed, now closed, on the Maryport line to the south of Carlisle station. The Waverley route, which crosses our line just beyond Kingmoor, remains in sight for a considerable distance to the north, the angle of divergence being at first very small. Rockcliffe station is now used as a halt, that is to say there is no staff, and tickets are not issued there. Between Rockcliffe and Floriston, a distance of two miles, there is an additional running line on each side. This widening was undertaken at a time when the traffic over this section was particularly heavy as a result of the War, and the establishment of the great munitions factory at Gretna. It was finished in 1919.



PLAN OF STATION SHOWING RUNNING SHED, GOODS YARDS, ETC.

Passing Floriston, and crossing the Esk, we see the wide spreading remains of the Gretna factory, through the middle of which the now almost disused Gretna branch of the North British can be seen threading its way. It runs into a small terminus close to the station of the Caledonian line. Immediately beyond the platforms of Gretna station, we cross the border, which is here formed by a small river, the Sark, and the Caledonian and South Western lines at once divide, the former pursuing a more or less northerly course, whilst our route curves sharply to the west.

The country traversed, which has been quite flat all the way from Carlisle, continues to be of this character, but we now have the gleaming line of the Solway on our left, with beautiful views of Skiddaw and other mountains of the Lake District across the water. In front rises the fine outline of Criffel, an isolated hill about seven miles south-west of Dumfries, whilst to the right, various ranges of the Dumfriesshire hills are visible. Gretna Green, the first Glasgow and South Western station, is barely a mile from the junction. Here and at Eastriggs (the next station but one) the villages built in connection with the munitions factory can be seen ; in fact the name of the latter station was changed from Dornock to Eastriggs on account of the new village of that name. Approaching Annan (17½ miles from Carlisle) we get a glimpse of the long, low outline of the Solway Viaduct to the left, and the line leading to it crosses our route by an over-bridge just before we reach the station. There is a physical connection between the two lines. The Solway Junction Railway (as this branch of the Caledonian is called) is still in use from Kirtlebridge Junction on the main line to Annan, but is closed beyond, owing to the weakness of the Solway Viaduct. Annan is not a large town, but it is regarded as of sufficient importance for several of the Anglo-Scottish expresses to call there, either regularly or conditionally.

At Cummertrees, the next station, we are almost on the shores of the Solway, and Silloth, Maryport, and other Cumberland towns can be distinguished if the weather is clear. In the neighbourhood of Ruthwell there is a sharp undulation before the line descends again to sea level. The last stretch before reaching Dumfries traverses Lochar Moss, a picturesque but extremely boggy tract of country, which gave considerable difficulty to the engineers at the time of the construction of the line.

At Noble Hill Junction signal box we reach the beginning of Dumfries yard : from this point onwards there are separate goods lines to the west of the passenger roads for a distance of about a mile, as far as the south end of the passenger station. At Ramsay Place Junction, a little further on, we see to our left the very extensive goods station of the Glasgow and South Western section. Pleasance Junction Box succeeds, and controls the engine-shed lines and the south end of the station.

Dumfries passenger station is situated on a slight curve and is of singularly attractive design and appearance. The down platform is the original one and has towards its northern end a covered circulating area of ample extent, on which are the buffer stops of two single line bays, which open towards the north. The up platform, which was added subsequently, has glazed umbrella roofing supported by ornate iron columns between which are suspended baskets of flowers, whilst the space behind the railings at the south end of both platforms is pleasantly laid out with grass and shrubs. In addition to the two running lines there is a middle siding between the platforms, which is used for shunting and storing rolling-stock. The two sides of the station are connected by a covered-in foot-bridge but each of them is complete in itself, having a separate booking hall, bookstall, refreshment room, and carriage approach, as well as the usual waiting rooms, &c. On the down side are the parcels and telegraph offices and also a fruit stall, whilst the booking hall contained until recently a separate office for issuing tickets for the Caledonian trains, in addition to a large circular office for the Glasgow and South Western line. The station buildings, like most of the town of Dumfries, are built of red sandstone. There is a loading dock together with several carriage sidings to the north-west of the station. The platforms are numbered. No. 1 is the westernmost of the two bays. It is used for both the arrival and the departure of Caledonian trains, whilst No. 2 alongside is similarly employed for Kirkcudbright and Stranraer trains, though these sometimes arrive at the up main platform. No. 3 is the down main and is the only platform available for trains proceeding towards Glasgow or the Cairn Valley line. No. 4 is the up main platform, which has no bays and is used by all main line and Cairn Valley trains in the southward direction.

The station is equipped with telegraph-boards showing the running of trains—down trains reported from Carlisle and Annan ; up trains from Kilmarnock and Sanquhar. The station, together with the extensive yards surrounding it, and the Station Hotel, has long been lighted by electricity. The railway company formerly had its own power station just south of the station, but the current is now drawn from the town supply. The station hotel stands just opposite the station and is managed by the railway company. It is well arranged and well managed and is the recognised centre of much of the county life. As it is the only first-rate hotel in the town, its capacity is often taxed to the uttermost.

The engine sheds will accommodate about 30 locomotives and a considerable number of 4-4-0's are stationed here, together with many goods engines. Main line expresses, however, do not change engines at Dumfries, though they usually draw water from the water columns on the platforms.

Lockerbie Junction signal box controls all movements at the north end of the station, and is the largest of the five signal cabins at Dumfries. It governs the junction of the main line with the Stranraer and Lockerbie branches, which here diverge on either side. Whereas to the south of Dumfries there is only the main route to Carlisle, in the northward direction we are at once confronted with these three different routes, whilst a fourth—the Cairn Valley line—leaves the main line at an outlying signal box some two miles north of the station. Opposite Lockerbie Junction box is an interesting survival of the past, in the shape of a castellated telegraph-hut, placed high on the bank of the cutting, which was used in connection with the signalling of trains in early days.

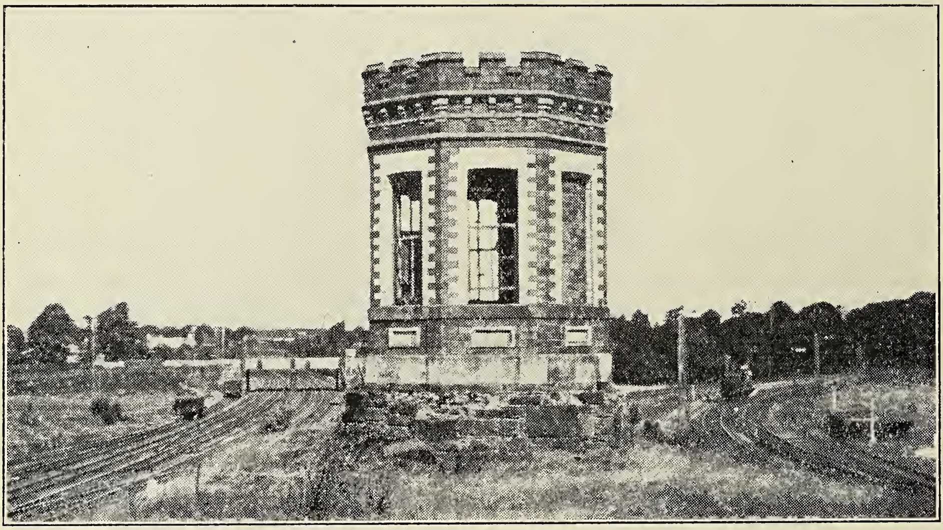


Photo.] [*J. J. Cunningham.*

ORIGINAL SIGNAL CABIN AT DUMFRIES.

G.S.W. Glasgow and Stranraer lines to left ; Caledonian line to Lockerbie, right.

The section of the line between Dumfries and Kilmarnock, a distance of 58¼ miles, is a straightforward piece of line calling for no special description. For the greater part of the distance the line follows the course of the river Nith, which is crossed several times. Between Carronbridge and Sanquhar stations, railway, road and river alike traverse a picturesque wooded defile with big hills rising sheer from its sides. Beyond Sanquhar the scenery is more bare and we traverse a small coal field. The summit of the line is reached at New Cumnock, 37 miles from Dumfries, and is 616 ft. above sea level. From this point the line descends sharply to Kilmarnock. From Dumfries to the summit it is hard collar-work almost all the way, and though the gradients do not exceed 1 in 150, it is a trying stretch for heavy trains.

The first section of the line that finally terminates at Stranraer is formed by the Kirkcudbright branch of the Glasgow and South Western. This is a double line as far as Castle Douglas (19¾ miles), where the old Portpatrick and Wigtownshire Joint Line diverges. The Stranraer route was described last month, so that no more in regard thereto need be said here.

The Cairn Valley Light Railway was opened in 1905. It extends as far as Moniaive, a large village, 17½ miles from Dumfries. It is, of course, single, and is of economical construction throughout. It was at first worked by a rail motor-car, but a short train of ordinary six-wheel rolling-stock is now employed. For a long time the train service consisted of only two trips in each direction daily, but for the past three years there have been three down trains and four in the opposite direction. There are frequent intermediate stations, and the district served is a very pretty one. Instead of the ordinary semaphores, Sykes "Banner" signals are employed on this branch, as at St. Enoch station, Glasgow.

The remaining line to be considered is that of the Caledonian section which connects Dumfries with Lockerbie, 14¾ miles distant, on the west coast main line. After leaving the Glasgow and South Western line a few chains to the north of Dumfries passenger station, the line remains double for about half a mile as far as the signal-box which controls the junction with the lines leading to the Caledonian goods station. This is of ample size, and includes a lofty bonded warehouse. Beyond this point the line is single, with crossing-places at Shieldhill and Lochmaben. About 2 miles from Dumfries is a platform serving the large motor works of Messrs. Arrol-Johnston, and special trains are run to convey workers to and from their work. At Locharbriggs there are extensive quarries of red sandstone, from which most of the building stone used in the district is taken.

Dumfries is an open station, tickets being collected in the corridors of express trains, and at adjoining stations in

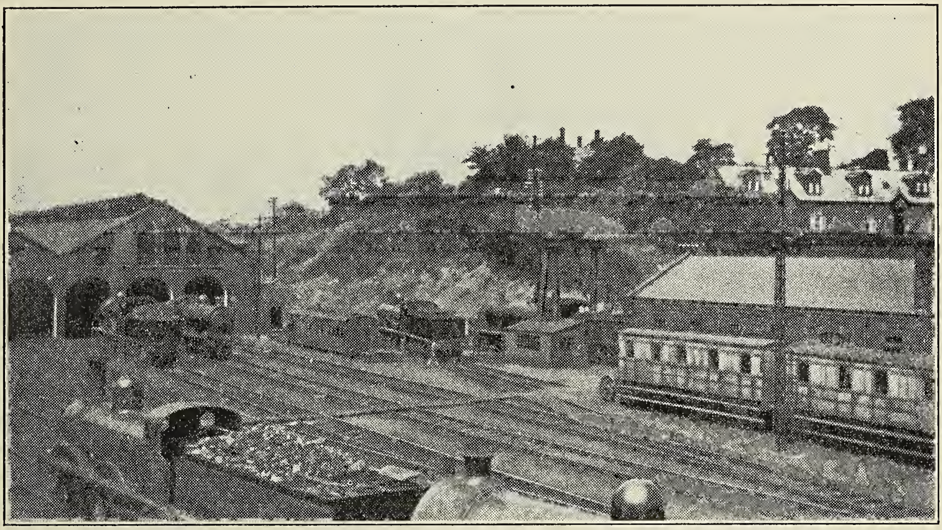


Photo.] [*J. E. Kite.*

ENGINE SHEDS AT DUMFRIES.

the case of local and stopping services. Turning now to the train services, the main Anglo-Scottish route between London (St. Pancras) and Glasgow (St. Enoch) first claims our attention. Dumfries is 341½ miles from the former, and 82½ from the latter station. It has always enjoyed the full benefit of the excellent services formerly provided by the Midland and Glasgow and South Western companies, and now continued, on the same general lines, by the London Midland and Scottish. The only trains to pass Dumfries without stopping were the short-lived "flier" of 1908, which stopped only at Shipley (to change engines) and Carlisle between the two termini, and the second up night train (11.10 p.m. from St. Enoch), which formerly ran daily and used to make a non-stop run of 91 miles from Kilmarnock to Carlisle. Some of the stops before the war were conditional only, but they were usually made.

The quickest times between St. Pancras and Dumfries are at present 7 hr. 13 min. Down, and 7 hr. 22 min. Up. This represents a speed, including stoppages, of about 47 miles an hour, which is quite a good figure, especially in view of the many difficulties of the Midland route south of Carlisle. In pre-war days the Winter service required 7 hr. 6 min. (Down), and 7 hr. 15 min. (Up), but there was one Summer train (the 11.50 a.m. from St. Pancras) which reached Dumfries in 6 hr. 51 min.

If the quality of the service has not much deteriorated as compared with 1914, the number of trains shows a distinct falling off, for the afternoon service which used to leave London and Glasgow at 1.30 p.m. has never been restored since the War, and the second night service reappeared in 1920 only to be again withdrawn in May, 1924. The latter deficiency has to some extent been compensated for by the alteration of the 11.45 p.m. from Euston, a portion of which now runs from Carlisle to Glasgow via Dumfries and Kilmarnock, and fills what would otherwise be a serious gap in the express services between Dumfries and Glasgow. As, however, the St. Pancras train was 30 min. quicker than the present train from Euston, its disappearance is to be regretted. It should, perhaps, be noted that it was re-introduced, on Saturday nights only, in October, 1924, replacing the standard service which is now "Saturdays excepted."

Whilst primarily associated with the Midland route, Dumfries has also a long-cherished connection with Euston, and it has always been possible to reach the town quicker from the latter station than from St. Pancras. Thus, last Summer, when the Daylight Service to Ireland via Stranraer was running, one could leave Euston at 10 a.m. and arrive in Dumfries at 4.53, this representing a speed of all but 50 miles an hour. There was, moreover, a through carriage by this service, though the writer has never seen this advertised.

Apart from the Stranraer trains, the grouping of expresses at Carlisle is such that by changing there, one can save 10–15 min. on the quickest Midland times even at the present moment. And, going back to 1907, this procedure would have enabled one to reach Dumfries in 6 hr. 44 min. by the 10 a.m. from Euston, which is the quickest time the writer has been able to trace as having ever existed. The distance to Euston is, of course, nearly 10 miles shorter.

A list of the chief trains at Dumfries may now be given. At 3.22 a.m. arrives the first portion of the Stranraer boat train, which generally leaves Euston about 7.30 p.m., but has sometimes in Summer, both before and since the War, been operated from St. Pancras instead. During the Summer of 1924 this was the case in the down direction only. A second portion arrives at 3.59 a.m., bringing the through carriage of the L. & N.E. Railway from Newcastle, and also a portion from Carlisle to Ayr via Kilmarnock. This train is, therefore, divided at Dumfries and proceeds at 4.5 a.m. to Stranraer and 4.8 a.m. to the North.

On Sunday nights, however, the Stranraer sleeping saloon and through carriages are attached to the 8.30 p.m. ex Euston Postal Limited, a somewhat unique privilege, and on Monday mornings they travel by the second portion of this train north of Carlisle. The ordinary night service (9.30 p.m. from St. Pancras) is at Dumfries from 5.28 to 5.32 a.m. This train, and the corresponding up service, often include three Sleeping Cars in their composition. There is a through carriage from Bristol attached. At 7.22 a.m. came in, in 1926, the 11.45 p.m. from Euston, which consisted of West Coast rolling-stock and was hauled by two Caledonian locomotives. On several occasions the writer saw it arrive with no less than 15 vehicles, five of which were Sleeping Cars and one a Pullman Breakfast Car running between Carlisle and Glasgow. This train was allowed only 2 min. at Dumfries, but as it was apt to be too long for the platform, this time was often exceeded. More recently, however, the main train has resumed its old course via Beattock, and a separate portion, with sleeping-car from Euston to Kilmarnock, serves the Glasgow and South Western section, calling at Dumfries, 7.27 to 7.29 a.m. The next important Down train calls at Dumfries from 1.43 to 1.46 p.m. It conveys through carriages from Sheffield and Manchester (Victoria) via Hellifield to Glasgow, and has connections with the whole of the Midland system, leaving St. Pancras at 4.25 a.m. The addition of a portion at Carlisle, which now includes a Glasgow and South Western Restaurant Car, makes this a heavy train. In Summer only, the Daylight Service to Ireland arrives at 4.53 p.m. in the shape of a train of G. & S.W. corridor carriages, with through carriage from Euston. Proceeding to Stranraer at 5.2 p.m., it gives an arrival in Belfast at 10.35 p.m. Close behind it is the 9.50 from St. Pancras, bringing also a through carriage from Nottingham and Sheffield, which is at Dumfries from 5.3 to 5.6 p.m. The second Day service now leaves St. Pancras at 11.45 a.m. and reaches Dumfries at 7.15 p.m., leaving again at 7.18 p.m. for Glasgow. This train also conveys a through carriage from Bristol. Corresponding Up trains leave at 11.8 a.m. for St. Pancras, Nottingham and Bristol 1.53 p.m. for St. Pancras and Manchester (Victoria), 2.40 p.m. (Summer only) Daylight Service from Ireland, reaching Euston at 10.0 p.m., 7.26 p.m. for Leeds and Bristol with the return working of the G. & S.W. Restaurant Car to Carlisle, 11.8 p.m. Sleeping Car train to St. Pancras (this leaves at 1.9 a.m. on Sunday only), and 11.58 p.m. from Stranraer to Euston (Sleeping Car).

All these trains run non-stop between Dumfries and Kilmarnock on the one hand (with the exception of the 4.8 a.m. and 7.29 a.m. from Dumfries), and southwards they are either non-stop to and from Carlisle or include a stop (sometimes conditional) at Annan.

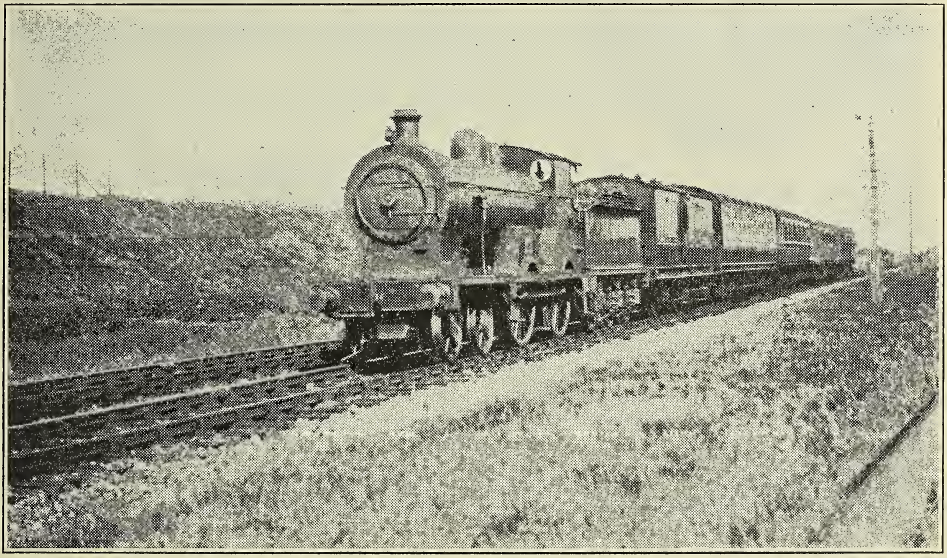


Photo.] [*C. J. L. Romanes.*

CARLISLE–GLASGOW TRAIN NEAR DUMFRIES.

G.S.W. 4-4-0 Locomotive No. 14201.

MR. J. RICHMOND, STATION MASTER.

In addition to the expresses, there are five or six stopping trains on the main line in each direction. These usually work through between Glasgow and Carlisle, though they may shunt at Dumfries to allow expresses to pass. The main line goods traffic is also extremely heavy, and the block sections are never unoccupied for long except on Sundays, when there is almost a complete cessation of traffic as is usual in Scotland. On the Stranraer line several of the trains, in addition to the boat expresses, work to and from Dumfries, and are often fast between Dalbeattie or Castle Douglas and Dumfries. Including Kirkcudbright trains the total number leaving Dumfries for the west is eleven, six of which call at all stations. To Lockerbie there are only five trains, with seven in the opposite direction, and an increased service on Saturdays, but though calling at all stations on the branch, they are of considerable importance, as they provide the chief means of communication between Edinburgh and South-West Scotland. Through carriages are run between Whithorn (in Wigtownshire) and Edinburgh in both directions, and these are sometimes attached to Liverpool-Glasgow expresses between Lockerbie and Carstairs.

The main trains between London (St. Pancras) and Glasgow (St. Enoch) have long been well known for the magnificence of their rolling stock. Both the Day expresses in each direction include separate Restaurant Cars for First and Third-class (some of them built in 1921), and to these is now added one of the new L.M.S. Central-Corridor Cars in which meals can be served if necessary. As the St. Pancras portion usually consists of six or seven vehicles, and there are the through carriages to Bristol, &c., and often extra vehicles working between Carlisle and Glasgow as well, the loads are seldom less than 240 tons and frequently rise to 300 tons at busy times. The 4-6-0 locomotives of the Glasgow and South Western Section and Midland type three-cylinder 4-4-0's are usually employed for these trains. Now, however, the other trains at Dumfries are mostly worked by 4-4-0's of various types, and consist of good bogie carriages for the most part. The Lockerbie trains are now hauled by Caledonian 0-4-4 tank engines, but this branch was formerly one of the last refuges of a very ancient class of 2-2-2 singles with outside inclined cylinders, and driving wheels of large diameter.

Mr. James Richmond (station master) entered the service of the Glasgow and South Western Railway at Girvan, 35 years ago. He has been station master successively at Trabboch, Pinwherry, Gatehead, Dreghom, Newmilns and Mauchline, receiving his appointment to Dumfries in 1920. Under his capable command are employed 108 of all grades in the passenger station, whilst the goods department is separately organised under Mr. Barbour.

Photo] [*R. A. Chrystal.*

1.30 P.M. EDINBURGH–ABERDEEN EXPRESS.
Locomotive No. 927.

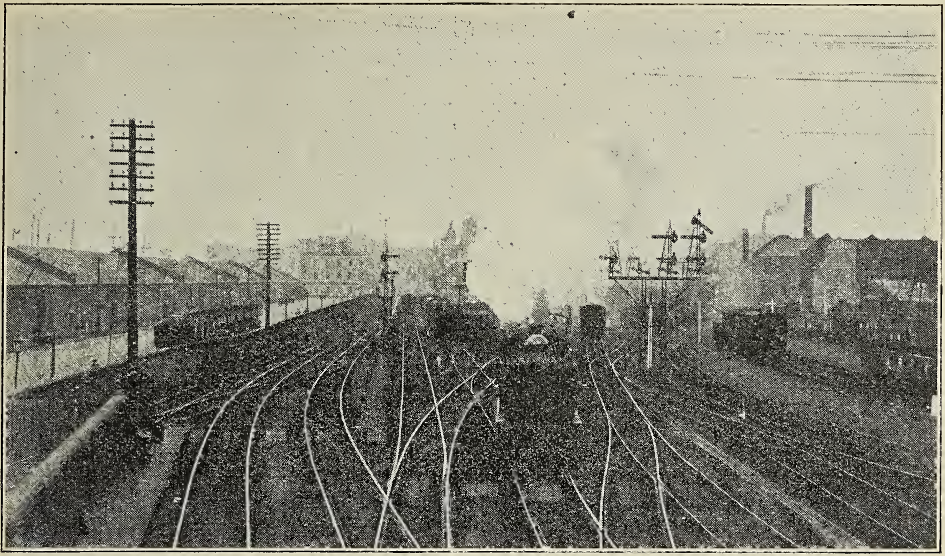


Photo.] **CAMPERDOWN JUNCTION, DUNDEE.** [*J. F. Gairns.*

Dundee Harbour premises to left; incline from Dock Street tunnel and Tay Bridge station, North British Railway, in centre; Dundee (East) station and goods yard to right. Caledonian Railway local train on Dundee and Arbroath joint line approaching.

Dundee as a Railway Centre.

RANKING as the third largest city in Scotland, and a big industrial and manufacturing centre, Dundee is served by an important series of lines, while its chief passenger and goods stations deal with traffic on a large scale. Moreover, the inter-relations between the Caledonian and North British Railways, and with the Dundee and Arbroath Joint Railway (managed and worked jointly by the two companies mentioned), and the lines of the Dundee Harbour authorities, include many interesting features.

The two principal stations, Tay Bridge, North British Railway, and Dundee (West), Caledonian Railway, and their respective goods depôts, both of large extent and dealing with considerable traffic, are all in line fronting upon South Union Street, close to the western end of the harbour and dock premises. The North British goods station is separated only from the River Tay by the fine esplanade which extends as a riverside walk as far as Esplanade station, at the north end of the famous Tay Bridge, and for some distance beyond. Tay Bridge passenger station is of through type, but the North British goods and the Caledonian goods and passenger stations are all terminal and on road level, except that from each goods depôt there is a surface track crossing public thoroughfares adjacent on the level, by which wagons are transferred by means of horses, and occasionally by locomotives as complete trains, to and from the Harbour lines, while goods and other traffic proceeding through between north and south of Dundee passes through Tay Bridge passenger station.

Harbour traffic is, however, chiefly dealt with by means of the North British main line through Tay Bridge station, and thence via Dock Street tunnel, from which trains ascend to reach the surface at Camperdown Junction, just beyond the Dundee (East) station of the Dundee and Arbroath Joint Railway, continuing for some distance alongside Harbour premises and making connection with the railway tracks of the Harbour area. This route is used by the Caledonian Company also for goods, and occasionally passenger traffic, proceeding through to north of Dundee via Buckingham and Camperdown Junctions.

Of the three passenger stations, Tay Bridge is the least notable architecturally, in that it is in a cutting, the station buildings being directly upon the platform, with the offices of the Northern District Commercial Superintendent, Mr. J. Wilkie, above. At road level, therefore, there are only suitable entrance ways. The Caledonian station, Dundee (West), on the other hand, has a notable block of buildings, including the offices of the District Traffic Superintendent, Mr. D. W. Barrie, and with an ornamental clock tower to give it further distinction. Dundee (East), the terminus of the Dundee and Arbroath Joint Railway, is also somewhat notable, as it has a good frontage, and an overall arched roof. Of the three, however, Tay Bridge station is the busiest, in that it is a through station, the principal stopping place on the North British main line between Edinburgh and Aberdeen, whereas the Caledonian Railway serves Dundee by means of the branch from Perth, other lines being of a local character, while Dundee (East) is concerned mainly with local traffic on the Dundee and Arbroath Joint line. In addition to main line traffic, too, Tay Bridge is the centre for several North British traffic routes, and has important local services. Furthermore, while it is purely a North British station, a number of Caledonian goods trains and light engines from and to the Caledonian engine sheds use the North British lines from Buckingham Junction via Tay Bridge station and Dock Street tunnel to obtain access to Caledonian and Joint line routes north of Dundee. Both companies also work goods trains to the Dundee Harbour lines via the North British station and tunnel instead of, or additional to, the surface connections already mentioned.

The general lay-out will be gathered from the plan of Tay Bridge and West stations on pages 4 and 5. Other aspects of the traffic are brought out in the series of articles which follow.

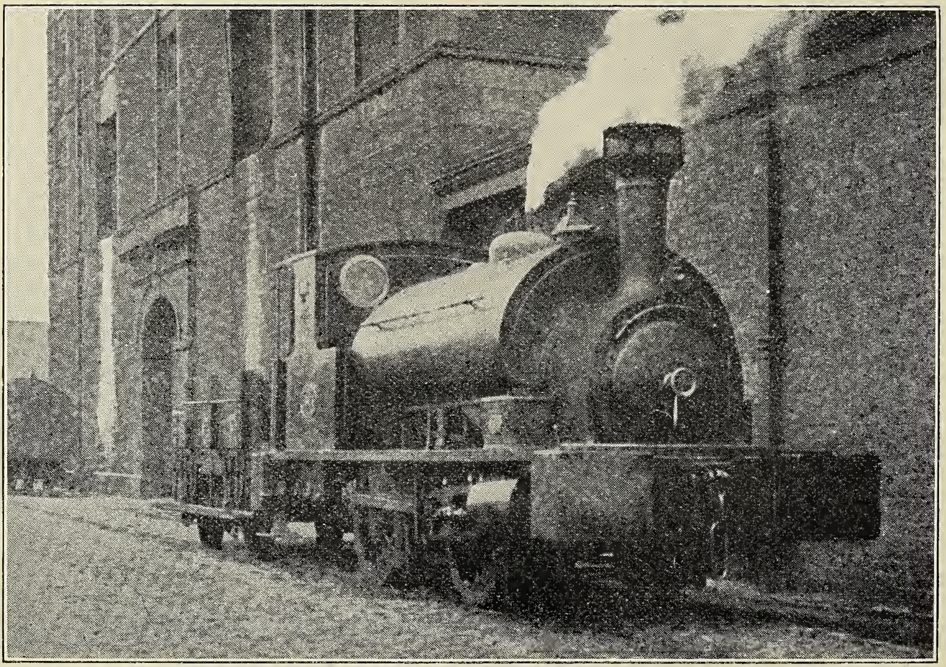


Photo.] [*J. F. Gairns.*

CALEDONIAN RAILWAY 0-4-0 SADDLE TANK ENGINE, WITH SHUNTERS' BRAKE VEHICLE, IN SERVICE ON THE DUNDEE HARBOUR TRUST LINES.

arranged so that road vehicles can be backed as required to ensure a minimum of manual transfer of goods. There is also an outside loading bank having tracks on either side, and at its outer portion a third road is let into it, the bank here being higher than elsewhere so that loads can be tipped directly into the railway wagons, a protecting rail being provided to prevent road vehicles being moved over the edge of the platform. The combined capacity is 60 wagons. The cattle bank is double-sided, and 16 wagons can be dealt with simultaneously. The middle yard contains eight sidings for 40 wagons each. The grain store accommodates about 250 tons. A 20-ton crane is provided in the yard.

Average monthly statistics of goods traffic dealt with at the North British goods depôt and in the yard and coal sidings attached are: outward loaded wagons, 3,387, representing a tonnage of about 8,000; wagons received for unloading, 3,468, tonnage 10,000; coal, 1,900 wagons, 16,000 tons. Goods traffic includes large quantities of flax, hemp and tow; finished yards, Hessian cloth as used for the manufacture of linoleum, sacking, tarpaulins, carpets, oakum, also raw jute, and other materials required by the staple industries of Dundee, together with large tonnages of finished and semi-finished products. Machinery figures to a considerable extent, while there is a large export traffic in marmalade and preserves, confectionery and sweets, whisky, &c., and an important general traffic in groceries and sundries, oil, potatoes, &c. As a shipping centre, there is also heavy traffic in shipbuilding material and in ships' supplies.

North British goods traffic to and from the Dundee Harbour premises is also under the general oversight of Mr. Boyd. Apart from the Harbour staff there are about 12 shunters, these being provided year by year alternately by the Caledonian and North British Railways. When the North British Railway is responsible, these men are under the control of the Tay Bridge stationmaster. The District Commercial Superintendent, Mr. J. Wilkie, who is located at Dundee, has oversight of the whole of the northern district in regard to commercial aspects, the operating side being under Mr. D. McRobbie at Burntisland.

We are indebted to Mr. J. Wilkie, Northern District Commercial Superintendent, and Mr. D. McRobbie, Northern District Operating Superintendent, and their staffs, for material assistance in regard to the compilation of this article, and to Mr. Henderson and Mr. Boyd, as concerned directly with Tay Bridge passenger and goods traffic, for information and general assistance rendered in regard to their respective departments.

Photo] CALEDONIAN RAILWAY. [*Mr. N. Devonshire Jones.*

Oban-Glasgow Express in Callander Station; 4-6-0 Locomotive No. 921.

II.—DUNDEE (WEST) STATION, CALEDONIAN RAILWAY.

By CHARLES TRAVIS, M.Inst.T.

THE Caledonian Railway Company possess excellent facilities in the Dundee area for handling both goods and passenger traffic. While their goods station at Dundee (West) is, like most Scottish goods stations, somewhat unpretentious in appearance, this deficiency is more than compensated for by the individuality of the passenger station, which is built in a style generally characteristic of Caledonian practice. The two are situated alongside each other, the passenger station immediately facing Union Street, Whitehall Crescent, Dock Street and the harbour, and the goods station, which is built on reclaimed ground, lying between the passenger station and Tay Bridge station, North British Railway.

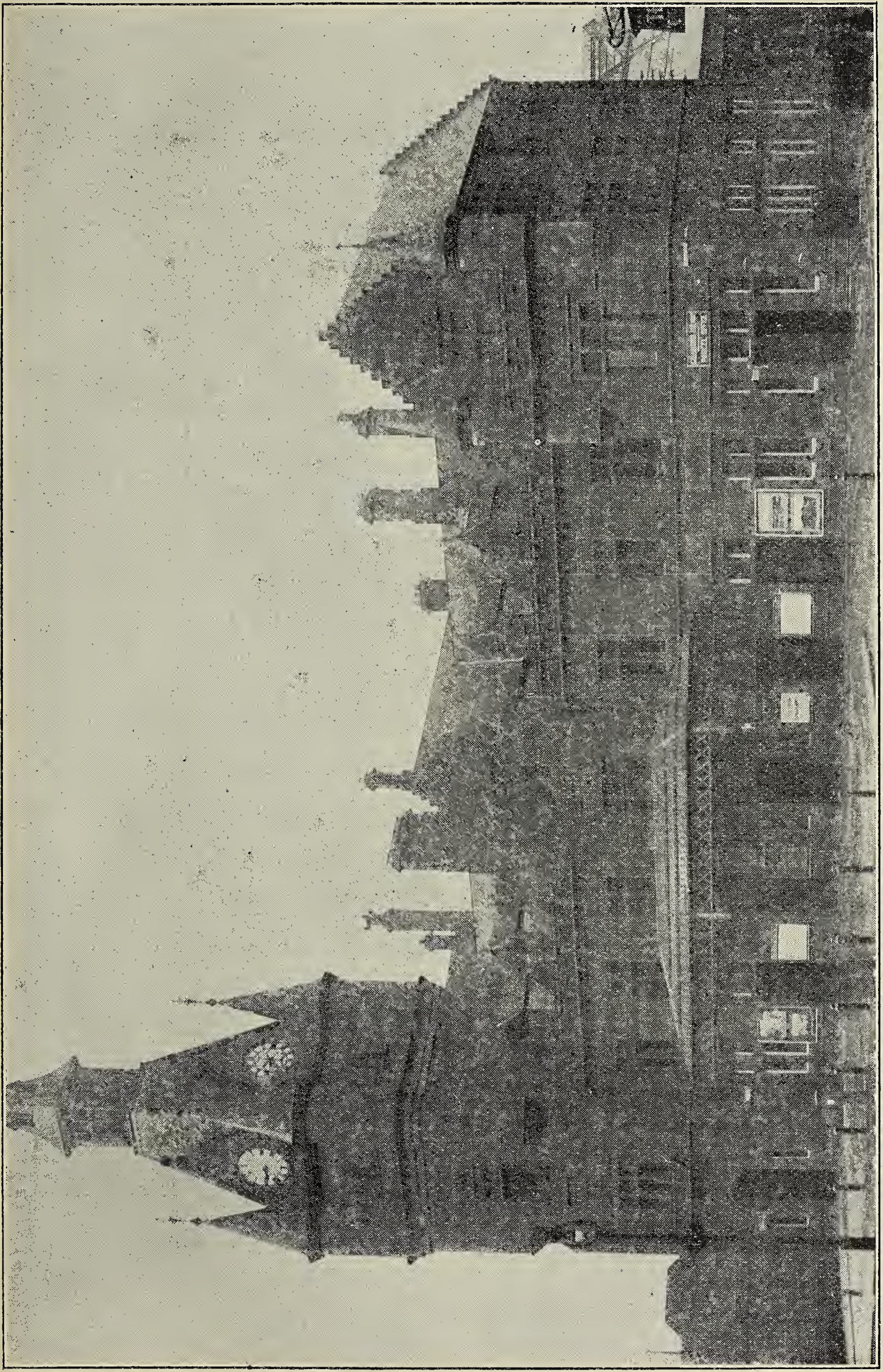
Dundee (West) passenger station was built in 1889, and is admirably equipped for dealing with its extensive local and through traffic. The station buildings have a two-storey frontage to Union Street, and, as will be noted from the accompanying general view, present a most pleasing appearance. The District Traffic Superintendent of the Caledonian Railway for Dundee and district, has his headquarters at this station, the district offices extending the full width of the building on the first floor—or " one stair up," to use the usual Scottish equivalent.

The booking hall is a lofty apartment, the booking office itself having a semicircular front facing the main entrance, while access to the circulating area is afforded to passengers through passages on either side of the booking-office. The parcels office is situated to the right of the main entrance and the telegraph office to the left. In the circulating area, which was recently doubled in extent, is a well-arranged train information board, giving clear indication of the time and platform of departure, this being located in full view of passengers as they enter the station. There is also a commodious bookstall, together with a fruit and confectionery stall for the convenience of the travelling public.

The passenger station essentially comprises two main platforms, each with a bay line, three tracks being interposed between the two main platforms and serving Nos. 2 and 3 platform faces, two tracks being to the left of No. 1 platform and ending in a bay, and one track to the right of No. 4 platform similarly ending in a bay. It may also be noted in connection with the track arrangement that a double line turns out from the main tracks slightly in advance of the station and runs between the passenger and goods stations, converging into one track prior to crossing South Union Street for the purpose of serving the various harbour lines. The four passenger platforms are used for both arriving and departing trains, and it may be added that the station is supplied with an admirable suite of rooms and offices, consisting of stationmaster's office, left luggage office, waiting rooms, first and third-class refreshment rooms, guards' and porters' rooms, &c., these being extended along the southern side of the station between the circulating area and No. 1 platform bay line.

The through traffic dealt with at Dundee (West) is largely with Preston, Manchester, Liverpool, Crewe, and the west of England, and London and the south, and is considerable, while the traffic with Glasgow, Edinburgh, and the south and west of Scotland is likewise heavy. There is also an extensive volume of local traffic with Perth, Gleneagles, Crieff, Blairgowrie, Coupar Angus, Alyth, &c.,. and the residential services between these places, as also the suburban services in the Dundee area, are largely utilised. Through coaches work regularly between Dundee (West) and Carlisle, Preston, London (Euston), Glasgow (Buchanan Street), Balquhidder and Crieff.

The stationmaster is Mr. Salmond, who has been at Dundee since May, 1912, and under his supervision the station staff, which numbers 90, comprises 3 inspectors, 13 clerks, 5 ticket examiners, 11 passenger train guards, 16 goods train guards, 42 porters, &c., &c. The signalling at the station is entirely mechanical, while facilities are provided for locomotive



DUNDEE (WEST) STATION, CALEDONIAN RAILWAY.

maintenance at the engine shed situated some distance beyond the station yard.

The Caledonian goods station at Dundee (West) handles a heavy and important traffic, principally comprising jute goods, preserves, whisky, groceries, potatoes, machinery, iron and steel. A considerable volume of traffic also passes to and from Dundee Harbour. In all, the goods station and associated sidings occupy an area of about 10 acres, standing accommodation being provided for, approximately, 750 wagons. The goods shed, which is a two-storey building, has two platform roads and a middle road and accommodates 90 wagons at one time. A further 105 wagons can be provided for in the yard and as 44 wagons can also be handled at outside loading banks, one to the left of the shed and the other in the yard, each platform face taking 22 wagons at one time, 239 wagons may be accommodated at one time in the station proper. Mineral traffic is dealt with in a group of sidings to the right of the goods shed, where provision is made for the standage of 450 wagons of coal and rough goods traffic. Of this number, the east mineral yard with eight sidings accommodates 138 wagons and the west mineral yard 306 wagons. The total mineral traffic dealt with in these sidings averages 15,000 tons per month.

The goods yard is arranged on a well designed plan, an extensive circulating area being provided between the entrance to the stations and the goods shed, while wide cart-ways extend the full length of the shed on either side. It may incidentally be mentioned that the bulk of the cartage vehicles, both at Dundee (West) and other Caledonian stations, berth alongside and not end-on the bank. On inquiry as to the reason, it was elicited that in their experience this is the most convenient method of loading and unloading. The goods offices immediately face the entrance to the yard and comprise the old headquarters of the Dundee and Newtyle Railway company, an interesting line which has received adequate attention in the pages of the RAILWAY MAGAZINE. The goods shed platforms are equipped with two 3-ton and eight 30-cwt. hydraulic cranes, supplied by Armstrong, Whitworth, Limited, and are of the low jib type.

Three wagon traversers and capstans are provided to facilitate the movement of wagons in the shed. These are constantly in use to meet the needs of the working. The traversers will transfer all clases of wagons except rail, timber, twin, gondola, and passenger train vehicles, from one side of the shed to the other. There is also a 15-ton hand crane in the yard. The store, situated over the goods shed, has an area of 1,125 sq. yards and is capable of holding about 1,000 tons of traffic. Two 1-ton hydraulic cranes are provided for the raising or lowering of traffic, this being effected through hatchways opening on to the rails between platforms in the goods sheds, and also through hatchways affording access to the roadways facing the north and south goods platforms inside the shed.

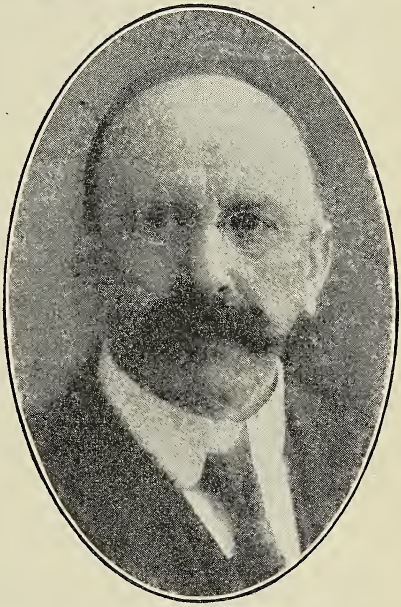
Speaking generally, the traffic handling methods adopted at Dundee follow the best practice, and it may be noted that, although it is not the case at all Caledonian goods stations, the numerical system of loading is in operation at Dundee (West). Under this method, the wagons set for the reception of outwards traffic are given a progressive number instead of being indicated by the name of the destination station, this number being clearly shown on the wagon side. The checker then chalks the appropriate number for the particular destination station on the package for the guidance of the truckers, who are thus directed to an easily identified position. The numerical system has the further advantage of enabling the loader more readily to check the packages, and it is stated that, since the adoption of this system, the loading operations associated with outwards traffic have been accelerated very considerably.

In view of the great importance rightly attaching to the average loading of wagons, this phase of working is specially supervised by the agent, and an inspection of the figures showing results obtained indicate that the average figure is satisfactory. In view of the fact that fully 65 per cent. of the traffic handled at Dundee (West) comprises sundries of a miscellaneous character, frequently involving a large number of consignments, each comprising many light packages, the "cost of handling" figure is a reasonable one; it is, in fact, not too much to say that it is one of the best I have encountered.

Including mineral traffic, the traffic handled at this station in normal times aggregates about 30,000 tons per month, mineral and ordinary freight traffic being fairly evenly divided. The total number of invoices made out each month is about 9,000, with approximately 20,000 entries, while the inwards documents range around 6,500 with roughly 19,000 entries. In a normal week between 6,000 and 7,000 wagons are dealt with, this figure including traffic from and to the docks.

While I was at Dundee I learned that a considerable reduction had been effected in the claims expenditure, the number of claims having been reduced about 40 per cent. in the course of 18 months. This improvement is the outcome of various causes. First, a claims commission was appointed some time ago to investigate the handling of traffic generally over the Caledonian system, and the recommendations made by that Commission and carried into effect have no doubt been responsible to some extent for the improvement; secondly, an analysis of the claims paid at Dundee (West) is made periodically, and where damage or loss is taking place consistently on traffic for a particular district, steps are taken to locate the cause; thirdly, instructions are from time to time issued by the agent to his staff in regard to the proper methods of loading traffic, and personal visits to the traders for the purpose of urging upon them the importance of adequate packing of their traffic has also contributed to the decrease in claims expenditure.

MR. W. SALMOND,
Stationmaster, Dundee (West), Caledonian Railway.



MR. A. PATON,
Goods Agent, Dundee (West), Caledonian Railway.

The station is served by an extensive shunting yard to and from which the Newtyle branch, Fairmuir and Maryfield branch lines are served, and a little to the west there is an exchange junction with the North British Railway at Buckingham Junction, where a heavy traffic, particularly coal from Fife coalfields, is handed over by the North British to the Caledonian Railway. An important goods traffic is also exchanged between the two companies at this point.

The carting arrangements at Dundee (West) are typical of those in operation at many other Caledonian stations. The railway company turns out a certain amount of cartage strength, and the cartage contractors, Messrs. Wordie & Company, supply the balance required. To quote figures, it may be said that the railway carting section turn out 34 single and three pair-horse teams, while the cartage contractors employ between 60 and 70 horses on railway work at Dundee, some at the East but most at the West station. To accelerate the despatch of delivery traffic it is the practice at Dundee for strength to be provided from 4 a.m.

to unload sundry traffic from wagons arriving overnight and to load lorries and place them in position for lifting. This enables about 40 vehicles to be ready by 8 a.m., and represents a distinct advantage in connection with the delivery work. The City of Dundee is divided into 14 cartage districts, and it is usual for calls to be made in the morning and during the afternoon.

The whole of the work at Dundee (West) goods station is in the charge of an agent, Mr. Alexander Paton, who has been at Dundee since October 1, 1919, and before that was at Stobcross station, Glasgow. Mr. Paton is well known as a keen student of transport matters.

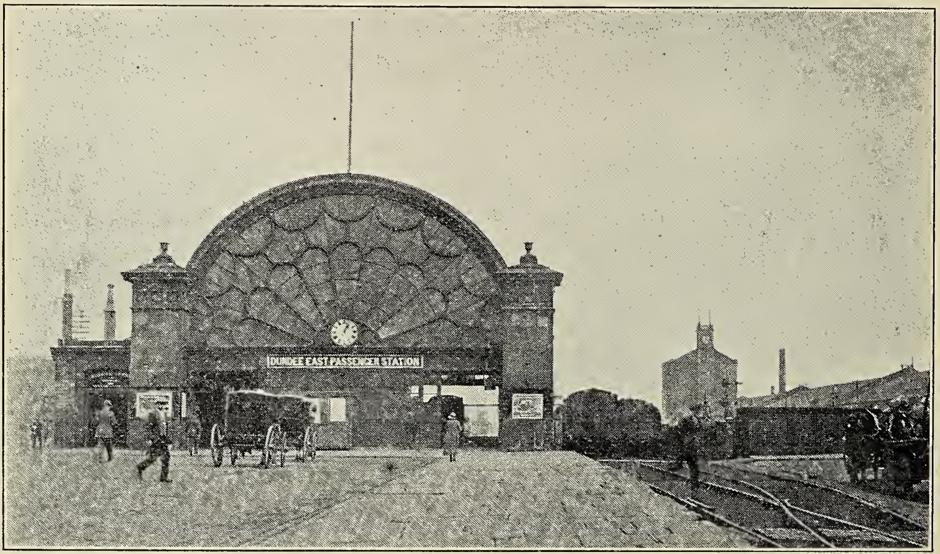
The staff numbers 172, the clerical grades absorbing 50, and the operating personnel including 1 foreman, 2 assistant foremen, 19 checkers, 11 loaders, 34 porters, 13 shunters and 42 carters.

It may be added as an indication of the working efficiency realised at Dundee (West) that a very favourable figure is recorded in weight handled per man hour, while the cost of working is comparatively low.

The District Traffic Superintendent is Mr. D. W. Barrie, O.B.E., and it is owing to his courtesy and the kind permission of Mr. R. Killin, C.B.E., Superintendent of the Line, and Mr. J. Ballantyne, O.B.E., Chief Goods Manager, that I am enabled to write this brief description of the facilities offered in Dundee by the Caledonian Railway Company.

III.—DUNDEE (EAST) STATION, DUNDEE AND ARBROATH JOINT RAILWAY.

THIS station, located alongside the harbour, is about half-a-mile from the Tay Bridge and West stations. The North British line from Tay Bridge station, on emerging from Dock Street tunnel, ascends on a fairly steep gradient, and at Camperdown Junction connection is made with the lines from Dundee (East) station, the route continuing as the Dundee and Arbroath Joint Railway. The Dundee and Arbroath Railway Company was incorporated in 1836, and opened from Arbroath to Craigie, about two miles east of Dundee East, on October 6, 1838. In 1839 the railway was brought about a mile nearer to Dundee, and on April 1, 1840, the terminus at Dundee (East) was reached. This extension was actually built by the Dundee Harbour Trustees, alongside whose premises the



Photo] [*J. F. Gairns.*

DUNDEE (EAST) STATION, DUNDEE & ARBROATH JOINT RAILWAY.

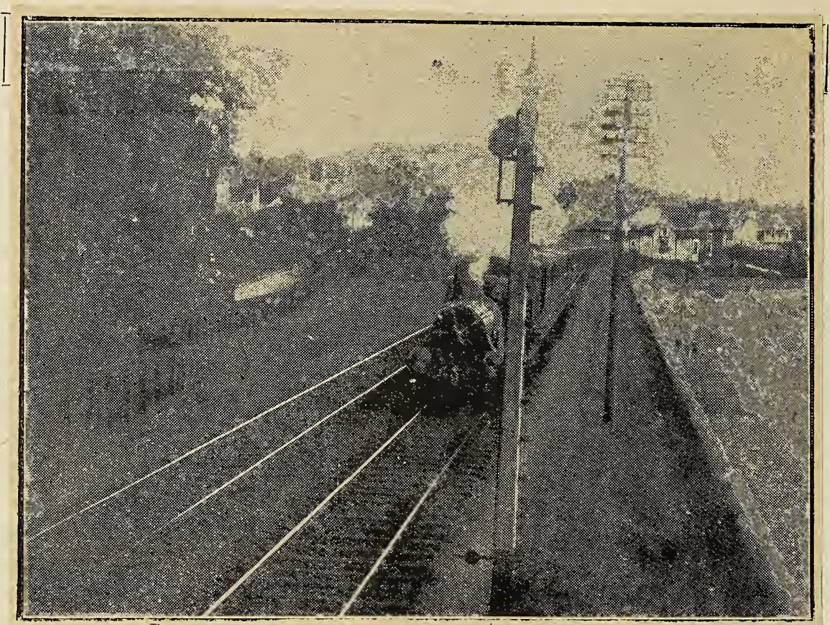
line runs for some distance, but was leased to the railway company, this arrangement continuing until 1907. The branch from Broughty Ferry to Broughty Pier was authorised in 1846. For many years this extension was utilised by train services to and from Dundee in connection with the North British ferry steamers between Tayport and Broughty Ferry, the only through route from the south possessed by the North British Company until the first Tay Bridge was opened, and perforce again from December, 1879, until the present Tay Bridge was brought into use in 1887. There is no need to consider the history of the Dundee and Arbroath Railway in detail, and readers may be referred to Mr. C. E. S. Littlejohn's article thereon in the September, 1909, number of the RAILWAY MAGAZINE. It may be mentioned, however, that the line was originally of 5 ft. 6 in. gauge, the conversion being made in 1847; that traffic was interchanged with the Dundee and Perth (now Caledonian) Railway from the West station by means of horse traction along the surface and dock lines, referred to in introduction, from 1847, a method which is occasionally used still; that for two distinct periods the Dundee and Arbroath Railway was leased to the Caledonian Company or its constituents, and that on February 1, 1880, it became the joint property of the Caledonian and North British railways, the latter having, in view of the completion of the first Tay Bridge, acquired a joint interest in the undertaking by virtue of the North British Act of 1879.

The Dundee and Arbroath Joint Railway was for a number of years managed by a committee of the two owning companies, and had its own managing staff, with headquarters and Secretary in Dundee, but since 1910 it has been managed and supervised by the officers of the owning companies.

Maintenance is under the direction of the owning companies, while locomotives and rolling-stock in respect of the Dundee and Arbroath local trains are provided by each company on the basis of equal services, taking into account the fact that the North British also uses the line for its train services to and from places beyond the Joint Line, and Caledonian Forfar trains use part of the route. Both companies are concerned in goods and mineral traffic, including that to and from Dundee Harbour premises, alongside which the railway runs for some distance, and with which several connections are made.

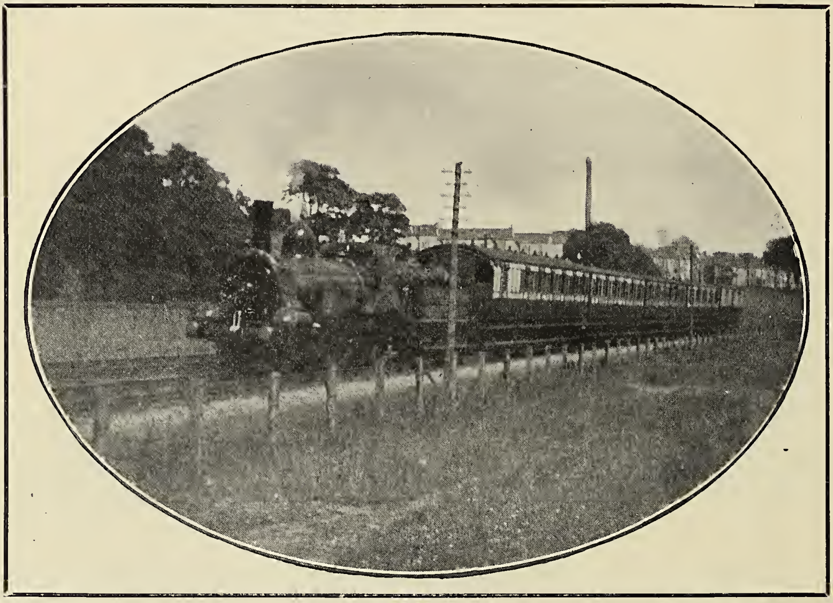
Dundee (East) station has a good frontage, well displayed by the wide open area adjacent to it, one of the principal entrances to Dundee Harbour being here provided. There are two main platforms under an arched overall roof, with a centre road between, and with bay lines on the outer sides of each main platform. As already mentioned, locomotives and rolling-stock are provided by each of the owning companies, the trains being usually worked by tank engines. They are all of a purely local character, and call at most stations between Dundee and Arbroath, except for the Caledonian trains to Forfar, which diverge from the Joint line at Broughty Ferry Junction. The greater part of the local traffic with places east and north of Dundee is concentrated upon the Joint line, there being quite a frequent train service either to Arbroath or to Carnoustie, 10½ miles from Dundee. There is, in fact, a heavy residential traffic from and to Broughty Ferry, Monifieth, Barry Links and Carnoustie stations, all in considerable favour with Dundee business people for residential purposes. For the morning traffic into Dundee (East) there are ten trains between 6.35 and 10.0 a.m.; on Saturdays nine trains leave between 12.7 and 2.10 p.m.; and for the ordinary homeward traffic there are ten trains between 4.0 and 6.15 p.m., and reasonably frequent trains thereafter until 10.50 p.m.

Associated with Dundee (East) station is a goods depôt, where goods traffic to and from the northward and eastward directions is mainly dealt with, and there are also several connections with coal yards and the premises of private firms. For some distance from Dundee (East) the line is crossed by several level crossings and footbridges giving public access to the dock premises alongside.



CALEDONIAN RAILWAY.

Arbroath-Dundee train, hauled by 2–4–0 engine No. 57.



Photo] CALEDONIAN RAILWAY. [*Miss H. Prescott.*

Perth-Glasgow Express.

July 1901

NOTABLE RAILWAY STATIONS.

XV.—EDINBURGH (Princes Street), CALEDONIAN RAILWAY.

By Smellie Tarbet.

THE foundation stone of the original terminus at Edinburgh of the Caledonian Railway was laid with Masonic honours on April 9, 1847, by the Grand Lodge of Scotland, his Grace the Duke of Athole, Grand Master Mason, assisted by the other officers of the Grand Lodge, in presence of the Lord Provost and magistrates of the City of Edinburgh, and the directors of the Caledonian Railway. On the conclusion of the ceremony, the chairman of the company (Mr. J. J. H. Johnstone, M.P.), in the course of a felicitous speech, stated that he and his fellow-directors had endeavoured to find plans for a building "on a scale that would do no discredit to the magnificence of the great City of Edinburgh." These plans were by Mr. Tite, the architect of the Royal Exchange, London, and provided for a building, the front of which was 370ft. in length, and consisted of a colonnade along its whole extent. In the centre, and at either end, were the principal offices forming three ranges of buildings rising over the colonnade, the whole works being in the Italian style, of massive outline and proportions. The area of the ground extended to about twelve acres, and the estimated cost of this and the proposed buildings was £100,000.

MR. P. GILLESPIE,
Superintendent, Princes Street Station.

This structure was, however, one which existed on paper only, for it never saw the light of day, and on the opening of the line on February 15, 1848, an intimation was made that the works in connection with the permanent buildings at Edinburgh had been suspended, and a temporary station, somewhat limited in extent, fitted up instead. This temporary structure was 180ft. in length, and 54ft. in breadth, and was situated at the south-western extremity of the city in Lothian Road. The writer of an article at the period in question describing the line and works, in a then leading periodical, confined his description of the station to the bare statement that it was a "striking object." Be this as it may, it did duty as the Caledonian Railway's Edinburgh Terminus for the period of no less than twenty-two years, viz., until May 2, 1870, when the line was extended forward a short distance to the western termination of Princes Street,

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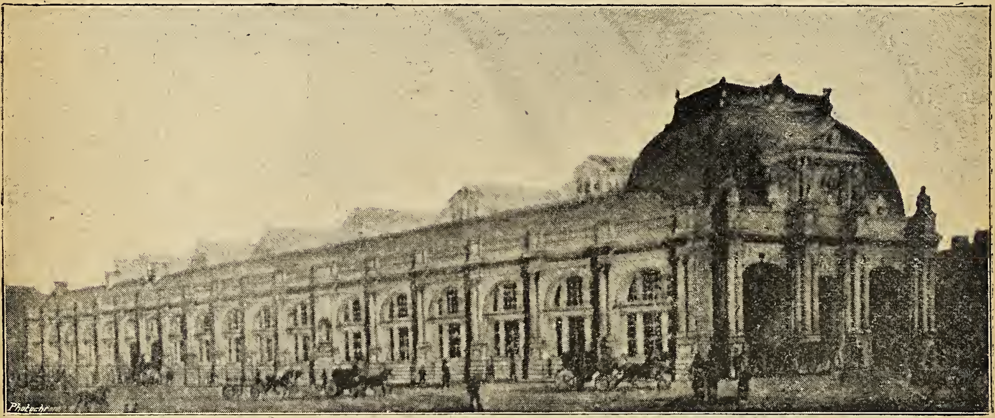
and a new station opened there. This station, which was also of a temporary character, was a rough wooden structure, parallelogram in form, some 500ft. long by 100ft. broad, having beneath its low roof two main and one subsidiary platforms. A very apt description of the structure is to be found in Mr. Acworth's book on "The Railways of Scotland," wherein it is described as "a wooden shanty." As the result of an outbreak of fire, it was partly destroyed in 1890, before which time, however, the contract had been let for the existing handsome stone building, by the erection of which the Caledonian Railway, after many days made good the statement of their chairman at the laying of the foundation stone of the original terminus, as the present station is certainly one which is no discredit to "Auld Reekie," viewed alike from the standpoint of internal arrangements or external appearance.

The engineers for the new station were Messrs. Cunningham, Blyth and Westland, and the architects Messrs. Peddie and Kinnear, both Edinburgh firms. The estimated cost was £120,000; the works were commenced in the latter part of 1890, and by the beginning of 1893 the station was, to a large extent, in use for traffic. The building is of a somewhat peculiar form, and may be likened to a wedge, with the tongue projecting towards Princes Street, and throughout the greater part of its length it is twice the breadth of the structure it replaced, being fully 1,000ft. long and 230ft. in width at its broadest part. A fine bayed roof, nearly 850ft. in length, springs from the stone walls which enclose the station east and west. The platforms are seven in number, and vary in length from 460ft. to about 800ft., their width ranging from 10ft. to 20ft.

There is no "centre" road between any of the platform lines to admit of an engine getting round its train, and so the train engines on arrival are locked up until either the train starts on its return journey with another engine, or the empty carriages are drawn out. Immediately the train is set in motion, the light engine, as a rule, follows it slowly forward to the starting signal, but when from any cause this is not done, the engine is required to remain at the buffer ends until the driver has received permission to move it out.

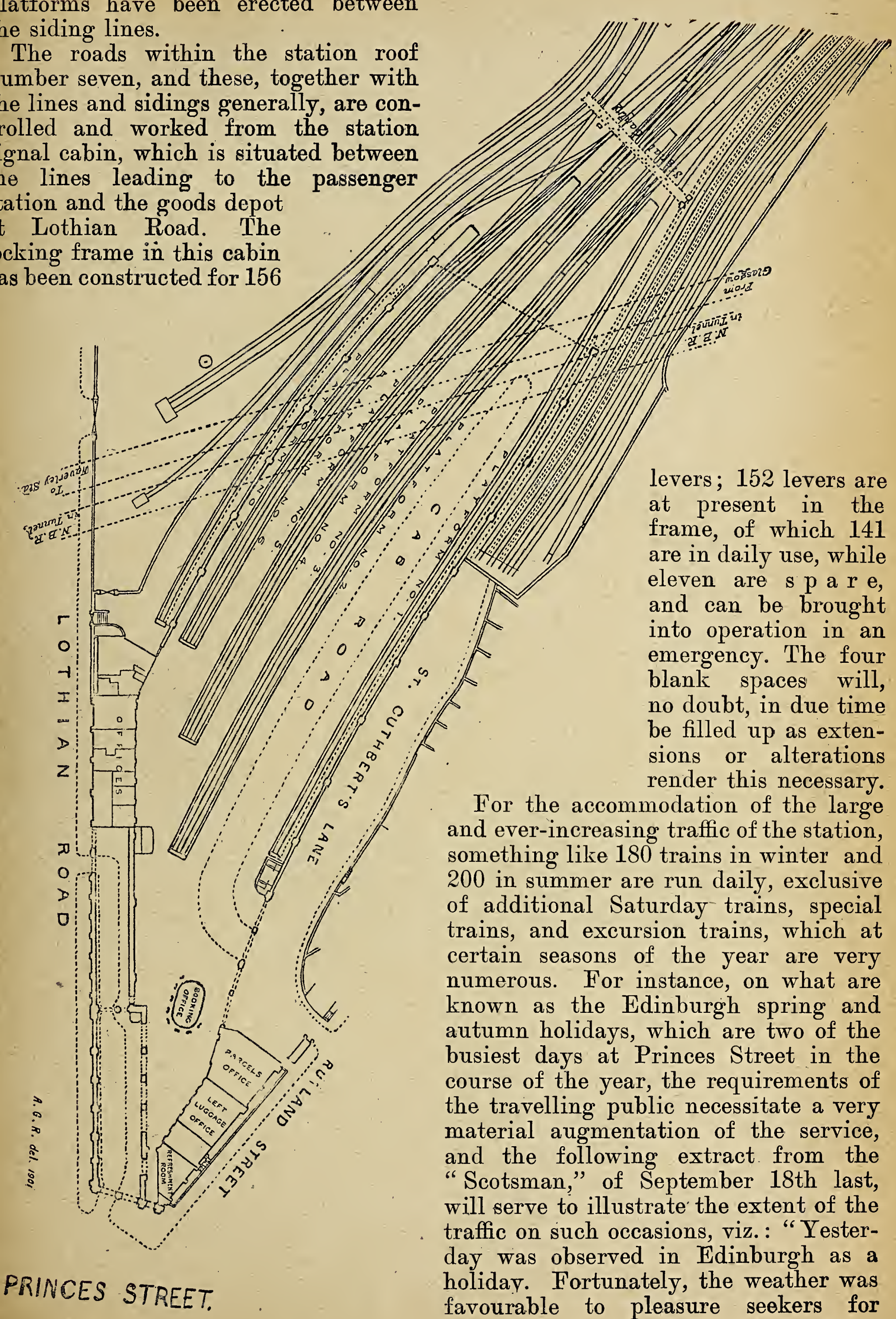
Adjoining the west wall of the station there are five sidings for the storage of empty passenger vehicles, and in order to facilitate the carriage cleaning work which takes place here, narrow wooden



EXTERIOR OF PRINCES STREET STATION, EDINBURGH,
As seen from the corner of Princes Street and Lothian Road.

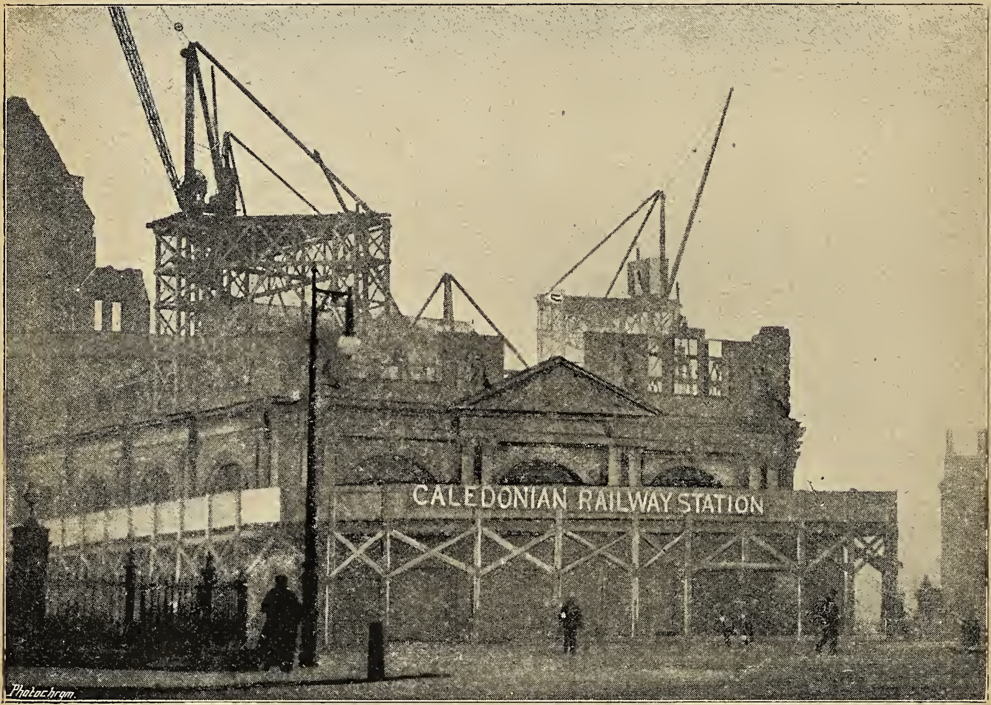
platforms have been erected between the siding lines.

The roads within the station roof number seven, and these, together with the lines and sidings generally, are controlled and worked from the station signal cabin, which is situated between the lines leading to the passenger station and the goods depot at Lothian Road. The locking frame in this cabin has been constructed for 156 levers; 152 levers are at present in the frame, of which 141 are in daily use, while eleven are spare, and can be brought into operation in an emergency. The four blank spaces will, no doubt, in due time be filled up as extensions or alterations render this necessary.



GROUND PLAN OF PRINCES STREET STATION, EDINBURGH.

For the accommodation of the large and ever-increasing traffic of the station, something like 180 trains in winter and 200 in summer are run daily, exclusive of additional Saturday trains, special trains, and excursion trains, which at certain seasons of the year are very numerous. For instance, on what are known as the Edinburgh spring and autumn holidays, which are two of the busiest days at Princes Street in the course of the year, the requirements of the travelling public necessitate a very material augmentation of the service, and the following extract from the "Scotsman," of September 18th last, will serve to illustrate the extent of the traffic on such occasions, viz.: "Yesterday was observed in Edinburgh as a holiday. Fortunately, the weather was favourable to pleasure seekers for although it was dull and foggy in the morning, matters improved as the day wore on. As usual, the railway companies offered special facilities for those wishing to travel to a distance, and the various excursions were well patronised. From Princes Street Station special trains, all of which were crowded, were run to Glasgow, Balloch, Peebles, Moffat, Carlisle, Lanark, Ayr, the West Coast, Aberdeen, Crieff, Comrie, Dundee and Callander."



EXTERIOR OF THE PRINCES STREET STATION HOTEL,
Now under construction, as seen from Princes Street.

The day's business at Princes Street begins at 4.0 o'clock, when an express leaves for Aberdeen and the North, and finishes at 11.5 p.m., on the arrival of the 10.0 o'clock train from Glasgow, except on Saturdays, when the closing time is nearly an hour later, viz., 11.52, at which hour the 11.31 p.m. Saturday train from Leith is due to arrive.

The most important of all the trains using the station are, of course, those departing for and arriving from London and the South, via the West Coast Royal Mail route, viz., leaving at 10.15 a.m., and 2.0, 6.0, 9.10 and 10.50 p.m., and arriving at 6.40 and 7.50 a.m., and 5.50, 6.15, 10.30 and 10.55 p.m.; while, again, the most popular of these trains, in each direction, are the 10.15 a.m. and 2.0 p.m. to London, and the corresponding trains in the opposite direction, due at Princess Street at 6.15 p.m. and 10.30 p.m., by which trains dining-cars are run. Luncheon-cars are likewise provided on the 10.15 a.m. train to Euston and the 10.0 a.m. from London, while corridor sleeping saloons are run by the 10.50 p.m. train to London, and on the express from Euston due at Princes Street at 7.50 a.m.

The service between Edinburgh and Glasgow is an admirable one, there being sixteen trains to Glasgow and fifteen from that city daily, with one additional train in each direction on Saturdays. Eleven of these trains perform the journey in 65min., while certain others accomplish it in 70min. The slow trains, which call at the intermediate stations, take two hours for the run. By way of comparison, it is worthy of note that a century ago the journey between the two cities by coach occupied between nine and ten hours, while at one time four and a half hours from Edinburgh to Glasgow was deemed a great feat of rapid driving.

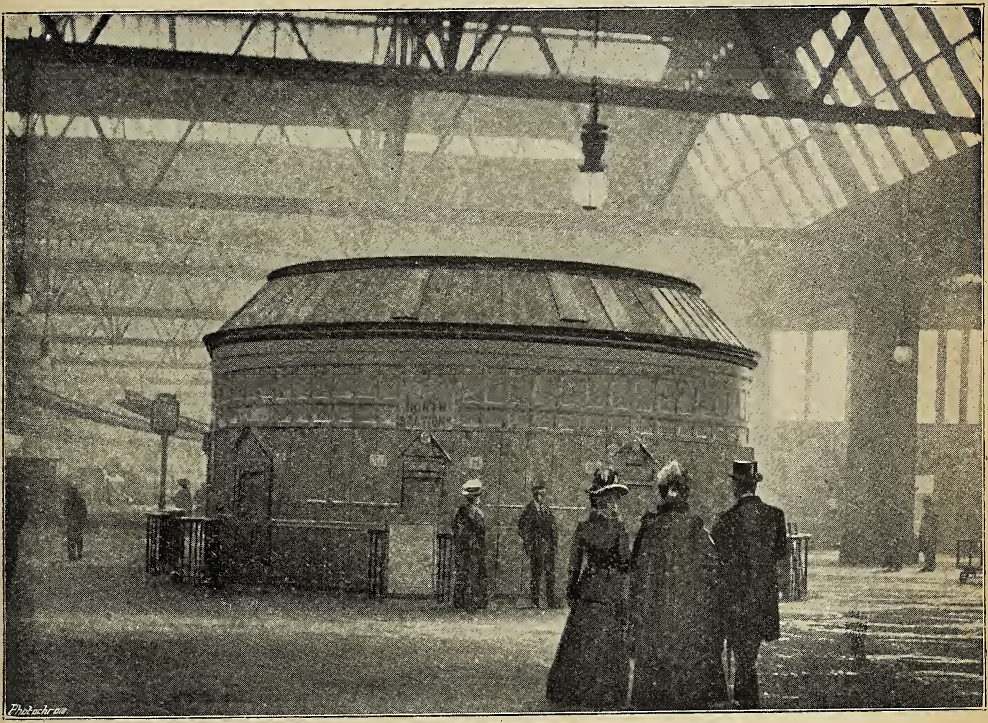
The other important main line services are those to Carlisle and Aberdeen, the trains to and from the former numbering twenty, and to and from the latter ten daily.

The local services are those to and from Balerno, Cramond Brig, and Leith, between which places and Princes Street trains are run at frequent intervals.

On Sundays the service is limited to three trains out and three in, viz., the 6.35 a.m. to the North, and the train from Aberdeen due at 6.5 p.m., the two night trains from the South arriving at 6.50 and 7.50 a.m., and the two corresponding trains to the South leaving at 6.0 and 9.10 p.m. respectively.

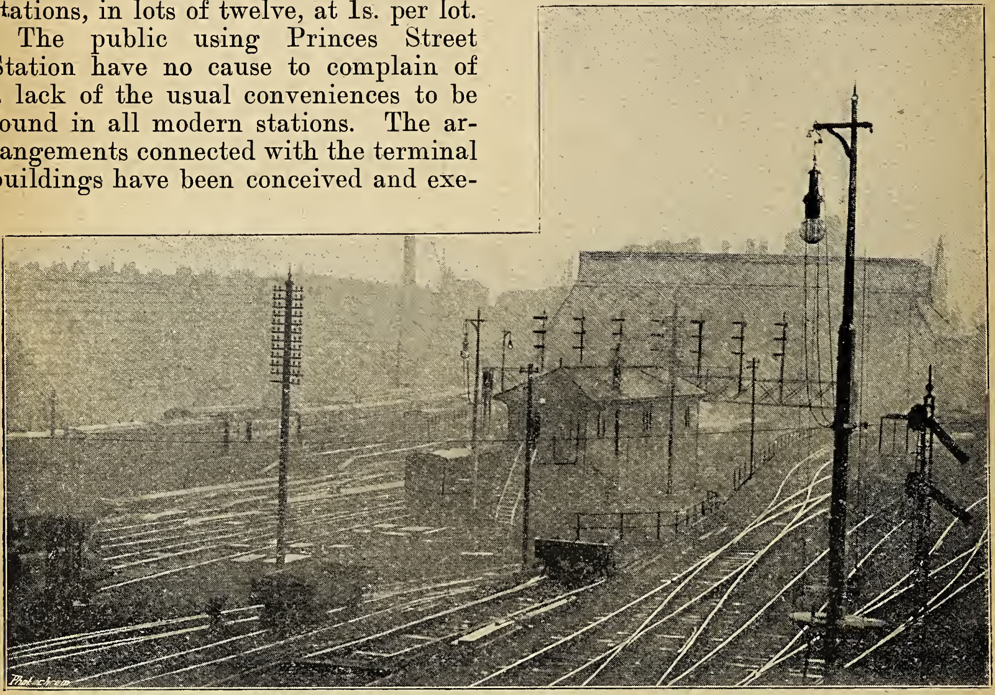
To those places on the Caledonian system between which and Princes Street there is not a service of through trains, the public convenience is met by the provision of through carriages, of which there are quite a number in daily use to and from various places, amongst the more important of which may be named: Ayr, Callander, Crieff, Dumfries, Forfar, Greenock, Gourock, Oban, Paisley, Peebles, Stirling, and Stranraer, while the South trains also convey through carriages to such places as Liverpool, Manchester, Preston, etc.

There are no trains specially provided for the conveyance of workmen to and from Princes Street. The demand in



THE BOOKING-OFFICE, PRINCES STREET STATION, EDINBURGH.

this respect is not, of course, so urgent in the case of Edinburgh as in, say, that of Glasgow and other similar cities, but for the convenience of workmen the company issue tickets available for a single journey either way by certain specified ordinary trains between Edinburgh and Leith, and intermediate stations, in lots of twelve, at 1s. per lot.



VIEW OF SIGNAL CABIN, AND PASSENGER AND GOODS LINES, AT ENTRANCE TO PRINCES STREET STATION.

The public using Princes Street Station have no cause to complain of a lack of the usual conveniences to be found in all modern stations. The arrangements connected with the terminal buildings have been conceived and executed in a generous spirit, and embrace extensive office, etc., accommodation for the station superintendent and his staff generally; very complete refreshment and dining rooms; spacious and well-furnished first and third class ladies' waiting rooms; a first-class gentlemen's waiting room; a general waiting room; telegraph office; excess luggage office; cloak room; and lost property office. To this last-mentioned office are conveyed the articles found in trains on arrival at the station, while the property of the "absent-minded beggars"—the term includes more than Tommy Atkins in this case—who use the stations and trains generally on the eastern section of the company's system also finds a lodgment there, Princes Street being the Lost Property Depot for that section of the line. The collection is a varied one, comprising the most of things, from a needle to an anchor. At the office numerous calls are made by, and complaints received from, the owners of missing property, and here, amongst others, may be found a specimen of the much-abused British domestic servant in search of a brown paper parcel containing her Sunday gown and bonnet left in the rack of the compartment in which she travelled a week ago, respecting which the want of a night out has prevented her making enquiries earlier; the "Toff" in quest of his gold-headed umbrella and cigar case, which he imagines he left in a train which arrived from the suburbs about eleven o'clock the previous evening—

he's not sure where he joined it; and the old lady, who informs the attendant, in a confidential whisper, that when she arrived, in the course of the forenoon, she omitted to take away her teeth, which she had taken out on the journey and laid on the arm-rest, preparatory to having a "nap." "You know," she explains with a smile, "I always take them out before I go to sleep."

In connection with the Telegraph Department, an arrangement in operation for the daily signalling of Greenwich time to the various stations, in conjunction with the firing of the time gun from Edinburgh Castle, may be mentioned. Briefly described, the *modus operandi* is as follows:—At two minutes before one o'clock daily, Edinburgh signals the word "time" on the various circuits with which that station is in connection, and then pins the needles of the instruments over to the right-hand side. On the firing of the time gun at one o'clock, Edinburgh releases the pins aforementioned and signals the word "one" on each circuit, which is instantly followed up by the clerks or signalmen in charge of the instruments at the termini of the various circuits. The stationmasters and signalmen at the intermediate stations and signal-cabins are on the look-out for the time signal, and regulate their clocks accordingly.

AMBULANCE WAGON.

The property of the Princes Street Station Ambulance Corps.

The Parcels Department, which is located in the Lothian Road section of the station, is under the charge of Mr. Scott, the parcels agent. The traffic of this department is no small item in the business of the station, and a large staff of clerks, porters and vanmen are constantly engaged in the work connected with the delivery of traffic arriving by train, and the despatch of parcels brought to the station by the public, and collected at the thirty-nine Receiving Offices of the company within the city. Five deliveries of parcels are given daily, viz., at 8.30 and 10.45 a.m., and 2.45, and 5.0 and 6.0 p.m. Nos. 2 and 3 are to all parts of the city, Nos. 1 and 4 to certain districts only, while No. 5 is restricted to perishable traffic.

As will be observed from the ground plan, access to the station is obtained from Princes Street, Rutland Street, and Lothian Road. The first-named is the principal access, and intending passengers have no difficulty in finding the booking office, which is situated in the centre of the space between the two main buildings, almost directly opposite the Rutland Street entrance. This office has eight booking windows, and is 56ft. long by 30ft. broad. The supervision of the business of this department falls upon Mr. Thomson, the booking agent, who has the satisfaction of finding his receipts year by year on the increase.

Princes Street is purely a passenger station, the adjoining goods depot being known as Lothian Road Station. In order to facilitate the working of the traffic of the two stations, a complete system of telephonic communication has been established between the station superintendent's office in Princes Street Station and the following places, viz., the traffic regulators' cabin, Lothian Road goods office, electric light engine room, traffic inspector's office, goods yardsman's hut, locomotive office, Dalry Junction signal cabin, and Slateford Junction signal cabin.

The station is lighted throughout by electricity, generated by the plant in the railway's electric light works, situated on the west side of the line adjoining Rutland Court.

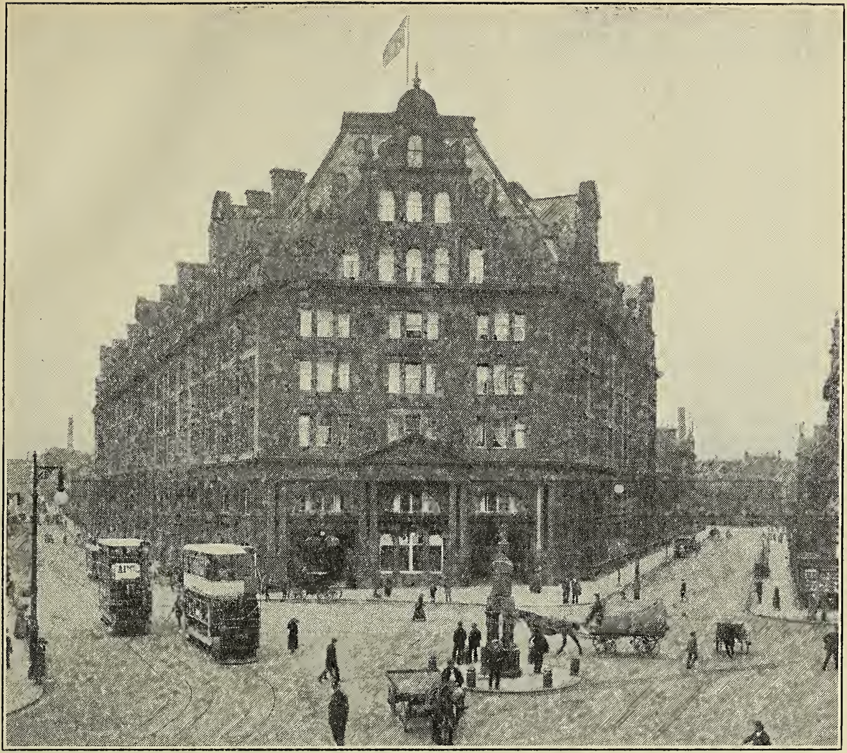
The total number of men engaged in the manipulation of the traffic within the station is close upon 200.

Certain members of the staff are very enthusiastic supporters of the ambulance movement, and, as will be seen from the illustration on the previous page, the station corps are the proud possessors of one of the finest ambulance wagons in the country. It embraces all the latest improvements, and is fitted inside and outside with the electric light. It may also be mentioned that a team from the station corps last year won the Caledonian Challenge Cup, the St. Andrew's Shield, and the Raith Trophy.

Mr. Peter Gillespie, the popular superintendent, passed through various grades of the service before attaining the position he now occupies. He entered the railway service as a lad messenger in the traffic superintendent's office at Stranraer, after which he was telegraph clerk and then general clerk in the same office. In 1884 he was appointed saloon attendant on the through express between Stranraer and London, and two years later was transferred to Glasgow, where he was employed in the Time-Table and Detective Departments, being subsequently made special ticket examiner. In 1892 he was appointed sub-inspector in the general superintendent's office, Glasgow, and when the late Mr. Farquharson was transferred to the new Princes Street Station in August, 1893, Mr. Gillespie accompanied him as assistant, and on the death of the former, in 1896, he was appointed his successor, a position which he has filled with credit to himself and the company he so ably represents.

As will be observed from certain of the illustrations, the company are at present erecting an hotel above the station buildings. The architects are Messrs. Peddie and Washington Browne, of Edinburgh, and the works were commenced in the beginning of 1899. These works have led to some temporary alterations in the internal arrangements of the station building, and necessitated the removal to Rutland Street of the district superintendent of the eastern section of the line, who was formerly accommodated on the second floor of the Rutland Street portion of the station buildings. Considerable progress has been made with the works, and the hotel bids fair to become what Sir James Thompson (the former manager, and now a director of the company), stated, in the Illustrated Interview which appeared in the RAILWAY MAGAZINE of October, 1897, it would be, viz., "a credit to the city, one of whose charms is its architecture."

* * *



EXTERIOR OF PRINCES STREET STATION, EDINBURGH; CALEDONIAN RAILWAY.

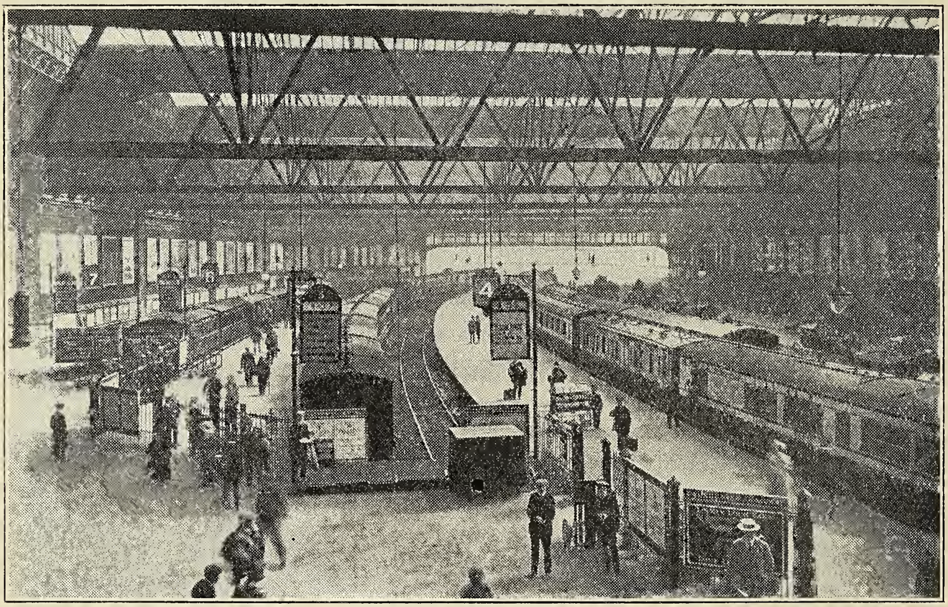
Notable Railway Stations and their Traffic.

PRINCES STREET, EDINBURGH, CALEDONIAN RAILWAY.

By J. FRANCIS.

SITUATED at the west end of Edinburgh's most famous thoroughfare, Princes Street, at the junction of several other main roads, adjacent to the business and residential districts and convenient for access to the industrial areas of the Scottish capital, the Caledonian Railway Company's terminal station, known as Edinburgh (Princes Street), ranks as one of the chief railway stations in Scotland. The combination of a great hotel, itself one of the leading hostelries in Edinburgh, and frequently the scene of municipal and other functions attended by dignitaries and leading personalities in the civic and industrial life of the city, and the Lothian Road goods depôt alongside, together render Princes Street station notable in regard to the area covered, while the hotel and the station proper possess considerable architectural interest. Princes Street station is intimately concerned with the important main line traffic to and from all the chief centres of industrial, holiday and tourist interest in England and Scotland, while large numbers of travellers, under season or zone ticket arrangements, make regular daily use of the station, in addition to the large volume of ordinary and excursion ticket traffic which is dealt with. The capital of Scotland has, in recent years, developed a heavy suburban residential traffic; the season ticket travel between Edinburgh and Glasgow being by no means a small factor, and the industrial and dock activities of the Port of Leith, Granton and other places on the Firth of Forth account for a great deal of local traffic, of which the Caledonian Railway obtains a substantial share, and all of which centres upon Princes Street station.

This station was described in the Railway Magazine for July, 1901, and the principal facts of historical interest may be briefly summarised. The foundation stone of the original station was laid April 9, 1849, with Masonic honours, " by the Grand Lodge of Scotland, his Grace the Duke of Atholl, Grand Master Mason, assisted by the other officers of the Grand Lodge, in the presence of the Lord Provost and magistrates of the City of Edinburgh, and the directors of the Caledonian Railway." The plans provided for a building " on a scale that would do no discredit to the magnificence of the great City of Edinburgh," but these were never fulfilled, and traffic was inaugurated on February 15, 1848, with a temporary station some 180 ft. in length and 54 ft. wide. The site was then in Lothian Road, a short distance away from Princes Street itself, and now forms a part of the principal goods depôt of the company in Edinburgh, and it was not until May 2, 1870, that the temporary station was superseded by the first Princes Street station, substantially on the site now occupied, but again of a temporary character. This erection was about 500 ft. long and 100 ft. wide, and does not seem to have been particularly imposing, seeing that Sir William Acworth in his book on "The Railways of Scotland," published in 1890, described it as " a wooden shanty." Arrangements were, however, already in progress for the erection of premises commensurate with the importance of Edinburgh as a traffic centre and worthy of the Caledonian Railway as one of the leading railway systems of Scotland, and work on this was accelerated in consequence of an outbreak of fire in 1890, which partially destroyed the second " temporary " station.



INTERIOR VIEW, FROM THE LEFT.

The estimated cost of the new station was £120,000, and by the beginning of 1893 a considerable part was in regular use. Even then, however, while the station proper was very much as it is now, the hotel had yet to be added. In fact, at the time our previous article, above mentioned, was written, the hotel was still in process of erection. Work was begun in 1899, and the hotel brought into use on December 21, 1903.

Princes Street station is, as already indicated, admirably situated from the point of view of convenience of access to the central districts of Edinburgh. The principal tramway routes pass its doors, while it is located at the junction of several important thoroughfares, notably, Princes Street, Lothian Road and Queensferry Street. From the architect's and engineer's point of view it occupies a somewhat awkward site, being fitted into the angle between Lothian Road and Rutland Street and Square. At the apex of the wedge, fronting upon Princes Street, however, an imposing effect is realised, the hotel and station entrance arcades matching one another, and the hotel buildings forming an appropriate stone superstructure. Along Lothian Road, too, the architectural scheme is continued, and as viewed so that both frontage and the Lothian Road façade can be seen, the effect is imposing and artistic.

Approaching the station from Princes Street the apex frontage includes three sections—the central and left-hand belonging to the hotel, while that to the right constitutes a wide arcade entrance to the station itself. Hotel premises complete the frontage above and extend some distance alongside Lothian Road, then giving place to a series of offices, including, on the first floor, those of Mr. Alexander Fulton, District Traffic Superintendent, and Mr. D. McLellan, District Engineer. Therefore, while from Princes Street the station presents a symmetrical appearance, it is somewhat peculiarly shaped inside. Originally there was an entrance roadway and cab road within an enclosing wall along Lothian Road, but this has all been incorporated in the hotel premises, while cab access is fully provided for from Rutland Street on the other side of the station, more especially as all platforms are used as required for either arrival or departure, but those adjacent to the cab road are selected as far as possible for main line trains.

INTERIOR VIEW, FROM THE RIGHT.

The railway diverges angularly with reference to Lothian Road, and, therefore, the platforms are of varying length, as they are brought as far as possible towards the main circulating area without restricting freedom of movement therein. The booking office is placed in the middle of the circulating area, as it widens out from the arcade entrance. It is approximately oval in shape, with nine booking windows, allocated for particular routes or destinations, and used as required to suit traffic needs. On either side of the circulating area are various station premises, mostly on the left hand on entering, those to the right extending only as far as the cab entrance from Rutland Street.

Passing through the tiled entrance arcade, on the left, is a hair-dressing saloon, accessible also from the reception hall of the hotel, and opposite to it is a cab order office. The walls of the arcade bear a tasteful arrangement of high-grade pictorial posters. Following the left-hand side of the circulating area a series of station premises may be noted. Passing one of two entrances to the hotel from the station itself the first office to be considered is Messrs. Williamson's steamship and railway ticket office, in connection also with the American Express Company, and where foreign exchange and other tourist agency business is transacted. Next is the postal telegraph office with a train arrival slate outside. Adjoining is the lost property and inquiry office, and next to that is the stationmaster's public inquiry office, where seats are reserved and other public needs met. The stationmaster's private office is above this, with projecting windows, so that he can see over the whole of the circulating area. This section is surmounted by a three-faced clock. The general refreshment room and a large bookstall complete this range of offices, &c., which are characterised by their neat and artistic cabinet and glass work. The bookstall curves round to meet the station wall, along which may be noted: ladies' first and third-class waiting rooms, gentlemen's first-class waiting room, an entrance to the station direct from Lothian Road, with a tobacco stall on one side of it, general waiting room, lavatories, an entrance to the company's offices above, and a covered passage leading to the commodious parcels office, the main public entrance to which is in Lothian Road.

On the right of the circulating area as it opens out from the arcade entrance may be noted a first-class refreshment room (with oyster bar), second-class refreshment room, restaurant and dining rooms, left luggage office, and two telephone call offices. Round the corner towards the cab entrance are porters' rooms, &c. Except for the booking office and a sweetmeat and fruit kiosk, the whole of the circulating area is left clear—an important point seeing that at times the station has to deal with passengers in large numbers. At one end of the booking office is a small tobacco stall.

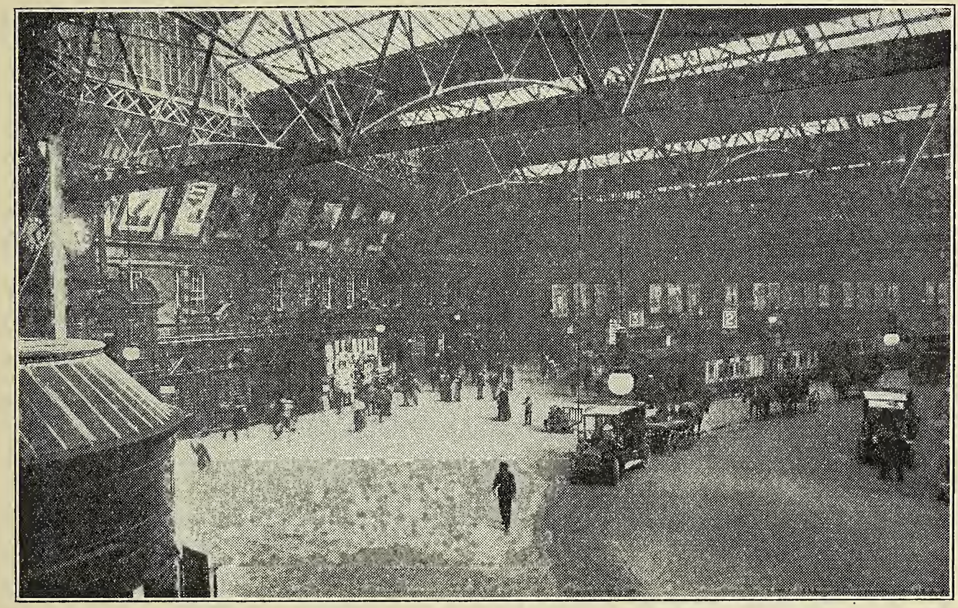
It will be seen, therefore, that the station is well equipped from the refreshment and restaurant point of view, while the needs of travellers are taken fully into account and all required offices are most conveniently arranged. At the end of each platform are large frames adapted to receive boards bearing the names of principal stations on the various routes served, together with the departure times of the trains. Nos. 1 and 2, on either side of the cab road, are generally treated as open platforms, all others being closed except to ticket-holders. As will be seen from the illustrations, they are of varying lengths, ranging from 433 to 700 ft.

The signalling at Princes Street is somewhat peculiar to modern ideas, due to the fact that the present equipment was designed when the station was built, and intended re-signalling and modernisation from the traffic working point of view has been delayed owing to the war, but for which the station would have been as up-to-date in this respect as it is in others. Alongside No. 1 platform is a series of carriage sidings and a connection giving access to the Dewar Place electric power station of the Edinburgh Corporation, which is supplied with coal, &c., during the night via the passenger station. On the other side is the Lothian Road goods depôt, its tracks making connection with the main lines about half-a-mile away from the station.

Approaching Princes Street there are six lines, two leading to the goods depôt, a siding line on the up side which connects with the shunting line, up and down main lines, and a second down line. Outer home signals—two for each of the down main lines—are placed on a signal bridge immediately to the west of Morrison Street Station and the shunting yard. Approaching trains, therefore, encounter these outer home signals for the respective lines and connections—one for the north side of the station and the other for the south side of the station—outside shunting limits, and before either of these outer home signals can be cleared one of the platform signals upon the big gantry spanning the station at its outer end must be "off." Apart from these outer home signals all station work is controlled by this bridge of signals. For each platform there is therefore a complete set of signals corresponding in every case, except that No. 4 has two starting signals, one above the other, as this platform can be left by either of two connections. Apart from the siding and shunting arms, the usual equipment for each line is an up starting signal on one post and three down signals controlling the entrance of trains to the various docks on another post.

The topmost signal on the down or arrival post is for trains arriving by No. 1 down main line, while the second signal is for arrivals by No. 2 down main line. The third signal, which is fish-tailed and ringed, is a precaution signal applying to either of the down main lines, and is only cleared when the dock is empty to the buffer end. It consequently gives the driver approaching the station the necessary information as to whether the dock into which he is running is entirely clear. In addition to the semaphore signals mentioned, each of the docks with the exception of No. 1 is equipped with a ground disc signal which is the starting signal for trains leaving the docks.

Traffic from Edinburgh divides into two sections—that in the Leith direction diverging from the main line at Dalry Junction, about half-a-mile from Princes Street, and that which follows the main line for at least two stations. The former includes the Leith and Barnton trains, together with the north main line trains which, after passing Dalry Road Station, diverge to join the North British Railway at Haymarket West Junction, thence using the North British Railway, by virtue of running powers, to Larbert. The other group includes the Glasgow stopping and express trains, main line and other trains to Carstairs, &c., and the Balerno branch trains which diverge at Slateford, and in some cases rejoin the main line at Ravelrig Junction.



GENERAL VIEW OF CIRCULATING AREA.

Altogether about 120 trains depart from and 125 arrive on a normal day at Princes Street Station, though during the summer, and especially at the local holidays, these are largely increased. There is a good amount of long-distance main line traffic, but the great volume is residential and suburban traffic. A considerable part of this is conducted under season ticket arrangements, but a special feature of Caledonian traffic in Edinburgh is the system of weekly zone tickets, permitting of unlimited journeys with tickets issued weekly and on a distance basis. The arrangements are very generous, and it is not surprising that the issue of zone tickets reaches very large totals in the course of a year. The following schedule of zone ticket rates from Princes Street will, no doubt, give rise to envious thoughts on the part of readers in less favoured districts :

WEEKLY ZONE TICKET RATES.

Edinburgh (Princes Street) with

	First.		Third.	
	s.	d.	s.	d.
Balerno or Curriehill	5	6	4	0
Juniper Green	4	10	3	3
Colinton or Kingsknowe ...	4	0	2	9
Slateford	2	6	1	9
Merchiston	2	0	1	4
Murrayfield	2	0	1	4
Barnton	3	9	2	4
Leith	2	6	1	9
Leith and Barnton	4	9	3	1

Moreover, there is very little workmen's traffic in Edinburgh, the purely workers' trains consisting of five in either direction between Princes Street station and Granton Gas Works, which convey workers to and from the Corporation Gas Works and another works in the neighbourhood. The ordinary morning and evening services carry a few odd holders of workers' tickets, but on most of the suburban routes radiating from Princes Street the regular passengers are almost wholly of the professional and business classes, as the district served, particularly on the Balerno, Barnton and Leith sections, are the most desirable residential areas within easy hail of the capital. During the summer months, Davidson's Mains and Barnton stations are very popular for day and half-day trips, serving, as they do, places on the shores of the Firth of Forth. In fact, it is by no means unusual for these two stations to deal with as many as 13,000 passengers in a single day. The Balerno line, which forms the key to the Pentland Hills, carries large numbers of passengers who make use of that picturesque but extremely "corkscrew-like" line for walking expeditions and picnics in the hill country.

Prior to the allocation of traffic during the war period, now happily at an end, Princes Street station dealt with a large proportion of the total London-Edinburgh traffic, and it is already regaining much of its pre-war favour in this respect. In the case of Liverpool and Manchester traffic, the Caledonian route always attracted the major portion. There are also valuable services between Edinburgh and Moffat, Peebles and Lanark ; and through carriages are run daily to Stranraer, on the Portpatrick and Wigtownshire Joint Railway.

Northwards, the connections to Stirling, Callandar, Oban, Gleneagles, Crieff and to the Highland Railway via Perth often necessitate long and heavy trains, while between Glasgow and Edinburgh there is a steady volume of daily traffic all the year round, considerable numbers of Glasgow business men residing in Edinburgh and travelling to and fro daily. At holiday periods through trains are also run from Princes Street to Gourock and Wemyss Bay, for the Clyde resorts, and to Balloch for Loch Lomond. Such trains are, in fact, regularly run at the "month ends" when so many Scottish families are travelling to and from the favourite holiday resorts and centres on the Clyde coast. Altogether, about 2¼ million passengers are booked annually at Princes Street station, while it is safe to estimate the numbers using it at from 5 to 6 millions per annum.

Parcels, milk, horse-box, motor-car and other traffic is, of course, dealt with at Princes Street as at other large stations. Much of the country milk traffic is, however, handled at Merchiston, the first station out, though that for the Leith line is transferred at Princes Street. Edinburgh, too, has its share of mail traffic, sections of principal mail trains working to and from Princes Street.

A few remarks may now be made in regard to the train services dealt with at Princes Street, and though those of the summer months may possess greater interest, it will be best to consider the present winter facilities in preference, in that they represent the standard arrangements, while it is probable that next summer the services will represent considerable improvements upon those of 1921.

Via the main line, traffic is divided between (1) trains in the Carstairs direction, including the south expresses, and trains for Lanark, Biggar, Peebles, Moffat, Dumfries, Carlisle or other destinations on those routes. (2) Glasgow trains, traversing the same route as far as Midcalder Junction, 11 miles from Princes Street; (3) a few trains which terminate at Midcalder, Fauldhouse or other intermediate stations on either of these routes; (4) and the Balerno line trains which serve Merchiston and Slateford stations, and in a few instances rejoin the main line at Ravelrig Junction and serve one or two main line stations beyond. The principal express trains, however, perform no suburban work within the Edinburgh area, except for an occasional call at one of the residential stations to provide fast facilities where the demand is justified. This feature is, however, peculiarly noticeable in the case of certain of the Edinburgh and Glasgow expresses, not for traffic into and out of Edinburgh but for the benefit of Glasgow business people residing at Edinburgh district suburban stations. Thus, the principal morning express to Glasgow, leaving Princes Street at 8.50 a.m., calls at Merchiston and also at Midcalder, in addition to the usual stop at Holytown, though it is yet required to reach the Central Station in Glasgow at 10.0 a.m. Similarly, on Saturdays the 1.35 p.m. from Glasgow calls at Shotts, Westcalder and Merchiston, while the 5.5 p.m. (not Saturdays) and 6.45 p.m. serve Shotts, Fauldhouse, Westcalder, Midcalder and Merchiston. All these, as well as the other expresses between Edinburgh and Glasgow, include a Pullman buffet car.

The Edinburgh and Glasgow expresses are designed to give substantially corresponding services in each direction, for throughout the day there is a steady interchange of passengers between the political and industrial capital cities of Scotland. Thus, the 8.50 a.m. from Princes Street (70 minutes, 3 stops) is balanced by the 8.40 a.m. from Glasgow Central (70 minutes, 1 stop); there are 70 minutes (one stop) expresses at 11.0 a.m. from each end; similarly at 1.35 p.m. there are non-stop expresses either way in 65 minutes, except on Saturdays, when each train is given two or three intermediate stops and corresponding additional time; the 3.45 p.m. from Princes Street takes 70 minutes, with one stop, and the 4.0 p.m. from Glasgow, 72 minutes, with two stops, the second at Merchiston, for Edinburgh residents; the

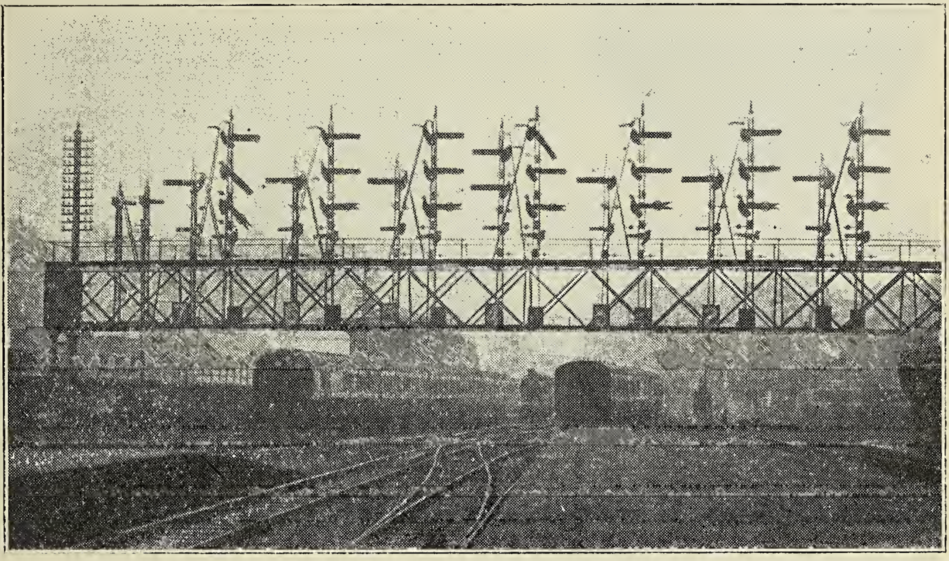


Photo.] [*J. F. Gairns.*

BRIDGE OF SIGNALS SHOWING CHARACTERISTIC FEATURES.

(*a*) No. 2 Down Main to No. 7 platform cleared throughout. (*b*) No. 1 Down Main line clear for shunting back into No. 4 platform.

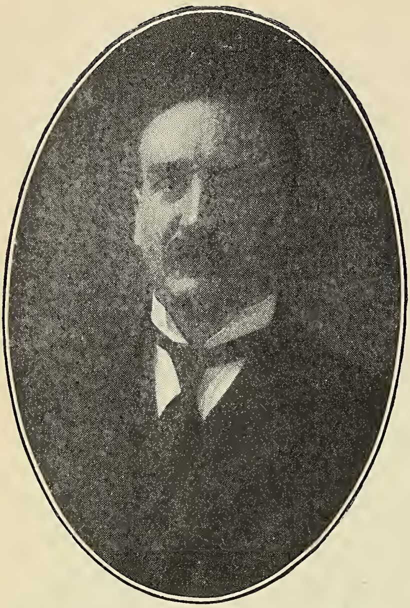


Photo.] [*J. Moffat.*

MR. ALEXANDER FULTON,
District Traffic Superintendent, Edinburgh.

4.55 p.m. from Princes Street is another 70 minute train (one stop), balancing the 5.5 p.m. from Glasgow as a semi-fast, both being "Saturdays excepted" trains; and the 7.5 from Edinburgh (70 minutes, one stop), balances the 6.45 p.m. semi-fast from Glasgow. Besides these, there is another express from Glasgow at 9.50 a.m. (70 minutes, one stop), and as all these trains include a Pullman car, the 6.20 a.m. stopping train from Edinburgh is similarly provided for balancing purposes and to furnish breakfasts to early travellers. There are also frequent stopping or semi-fast trains making the Edinburgh-Glasgow journey throughout, and several of these provide semi-fast local facilities for Edinburgh business people residing a few stations out. This applies principally in the outward direction from Princes Street by the 3.55, 6.0 and 8.5 p.m. Glasgow trains, with the 8.44 and 10.10 Saturday trains which run only to Fauldhouse, but is more particularly characteristic of certain trains on the Carstairs route, notably the 2.0 p.m. (Saturdays only), 3.50, 5.20 and 5.48 p.m. trains, with the 10.0 p.m. on Saturdays, which is more or less fast as far as Midcalder. Also by the 8.15 a.m. from Carstairs in the morning.

There is not, however, a great demand for fast suburban trains on these routes, and the chief necessity is that, by the stopping Carstairs, Glasgow and Balerno route trains, Merchiston and Slateford, and, to a lesser degree, Kingsknowe, Currie Hill and Midcalder, are given a reasonable number of trains to meet the requirements of (1) morning residential traffic into town; (2) mid-day outward and return traffic for lunch, as many residents go home for the mid-day meal; (3) the Saturday afternoon return traffic, and (4) the corresponding return traffic on other days. To complete the traffic provision of the nearer stations, local trains are run from Princes Street to Merchiston at 1.11 and (except Saturdays) 6.8 p.m. and in the morning from Merchiston at 8.41 a.m. and on Saturdays at 2.48 p.m.

The Balerno line, notable for its "corkscrew-like" location, and really more of a light railway in character, while it gives few evidences as it pursues its sinuous course along the picturesque valley of the Water of Leith (several important paper mills and other works are served by this line) that it does so, also serves important residential districts, notably Currie, Juniper Green, and Colinton. Four-wheeled coaches only are allowed upon it, and for this traffic three sets of eight essentially modern four-wheeled coaches (with spare vehicles for strengthening to 11 at busy periods) have recently been constructed by Mr. Pickersgill, Locomotive Superintendent at St. Rollox works. Except that they are four-wheelers, these vehicles accord with present Caledonian standards for suburban rolling-stock, having high elliptical roofs, safety-catch door locks, electric light, steam heating, &c., as in the case of modern bogie suburban carriages. The engines used are 0-4-4 tanks, with 4 ft. 10 in. coupled wheels. These trains stop at all stations, and therefore assist to meet the needs of Merchiston and Slateford.

Via Dalry Road, the suburban traffic is mainly served by the Leith and Barnton trains. For these, bogie or six-wheeled rolling-stock is used as convenient, while locomotives of any type may be employed. All trains call at each station, and as they serve Dalry Road, Murrayfield and Craigleith, Branton Road and Newhaven, all popular residential districts, in common, they together provide a very frequent service throughout the day.

So much for the suburban and residential traffic, to which, in view of the large extent to which it figures at Princes Street, pride of place has been given. Attention must, however, now be given to the main line services other than those to and from Glasgow. The first main line departure to the south is the 6.30 a.m. connection with a stopping train from Glasgow to Carlisle. This is followed by the 8.33 a.m. for Carstairs. Next comes the historic 10.0 a.m. London express consisting of through corridor carriages and a restaurant car from Edinburgh, not infrequently heavy enough to require running as a separate train to Carlisle, but ordinarily attached to the train from Glasgow at Strawfrank Junction. Following this is the 10.10 a.m. to Carstairs, a corresponding train for Liverpool and Manchester. The 12.50 p.m. (except Saturdays) works through to Lanark, but the 1.7 p.m. on Saturdays connects with a Glasgow train at Carstairs. The 1.30 p.m. is the Edinburgh portion of the mid-day Glasgow-London express, with restaurant cars from both places, and is attached at Carstairs to the Glasgow section. At 2.0 p.m. on Saturdays there is another through train for Lanark. The 3.50 p.m. is the afternoon connection to Carlisle, Liverpool and Manchester, and it also carries a portion for Lanark. The 4.45 p.m. (not Saturdays) is divided at Dolphinton Junction, the first part passing Carstairs and running direct to Symington, while the second part works through to Lanark. The 5.20 p.m. is similarly divided at Dolphinton Junction, the first part running to Symington and the second terminating at Carstairs, but on Saturdays working through to Peebles. The 5.48 p.m. is a stopping train to Carstairs. At 6.35 p.m. the special postal express leaves, attached to the main train at Symington. At 9.40 p.m. on Saturdays is an express sleeping car connection to the south via Carstairs, followed by the 10.0 p.m. "Saturdays only" train, for Carstairs. At 10.30 p.m. is the ordinary night sleeping car train for London (Saturdays excepted), conveying also through portions for Liverpool and Manchester, which go on by the 12.0 midnight train from Carstairs. Except for the through expresses, most of these trains call at various intermediate stations, while they also give complete connections with trains from Glasgow at Carstairs.

Arrivals at Princes Street from the south may be briefly summarised: 5.30 a.m., Edinburgh section of the postal express; 7.10 a.m., sleeping car express from London, &c. (Mondays only); 8.0 a.m., the corresponding train on other days; 9.27 a.m., stopping train from Carstairs; 9.33 a.m., express from Muirkirk at 7.20 a.m.; 12.45 p.m., from Carlisle at 9.5 a.m.; 3.58 p.m. from Carstairs 4.10 p.m., restaurant car express from the south; 5.31 p.m. from Lanark at 4.13 p.m.; 6.6, 6.30 amd 6.52 p.m., restaurant car expresses from the south; 7.33 p.m. (7.39 on Saturdays) from Carstairs; and 9.26, 10.10 and 11.2 p.m., restaurant car expresses from the south.

It now only remains to consider the north expresses from Princes Street, which travel over the North British Rail-

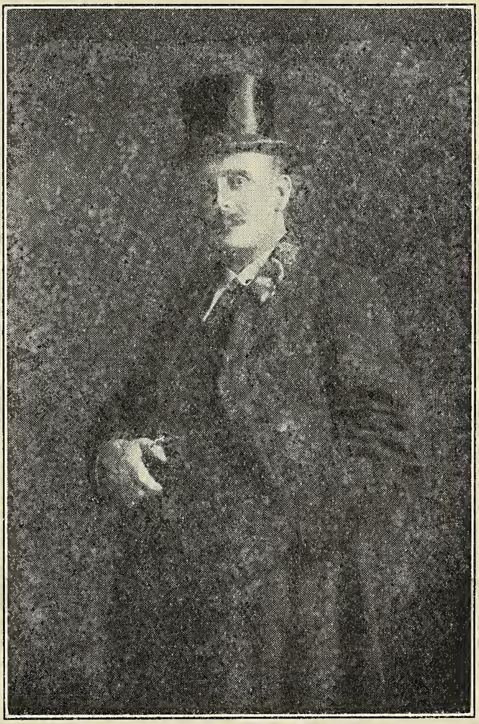


Photo.] [*Lafayette Ltd.*

MR. T. PRENTICE,

Station Superintendent, Princes Street, Edinburgh.

way between Haymarket West Junction and Larbert. These leave Princes Street at 6.45 a.m. for Stirling; 9.25 a.m. for Perth; 11.30 a.m. for Stirling; 1.15 p.m. for Stirling (Perth on Saturdays); 4.25 p.m. for Perth, and 9.45 p.m. for Stirling (where it is combined with the 10.0 p.m. from Glasgow (Buchanan Street)) for Aberdeen. Corresponding arrivals at Princes Street are: 10.14 and 11.7 a.m. from Stirling; 1.52 p.m. divided at Stirling from the 9.30 a.m. ex Aberdeen; 4.46 p.m. divided at Larbert from the 11.45 a.m. ex Oban; the 7.28 and 8.20 p.m. both divided at Larbert from Aberdeen or Perth trains, and the 10.20 p.m. divided at Larbert from the 5.30 p.m. ex Oban. Most of these trains include through coaches for several destinations. Thus, the 4.25 p.m. from Princes Street regularly includes 4 for Perth, 2 for Oban, 2 for Callander and 1 for Crieff, and not infrequently these trains require to be double-headed and a considerable and valuable traffic is conveyed by them.

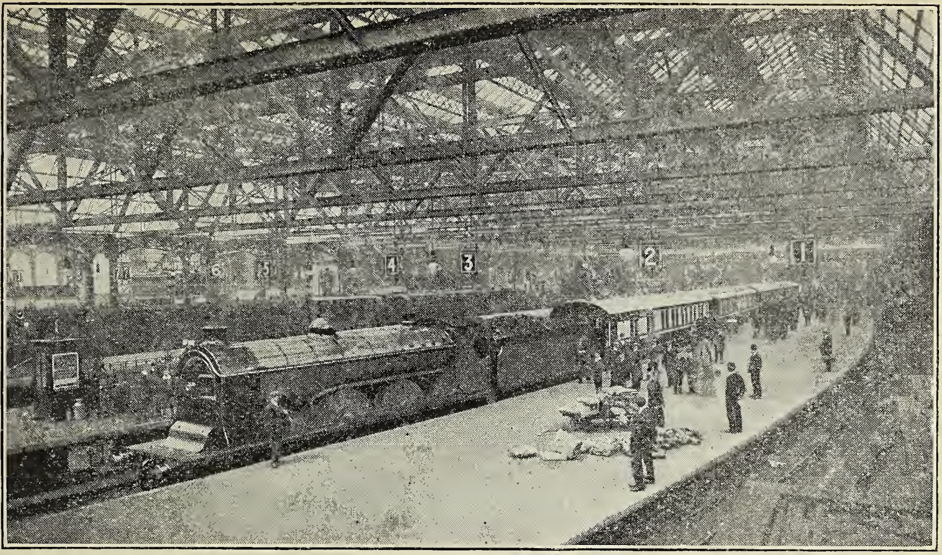
As in the case of most Scottish railway stations, there is very little traffic on Sundays, and that usually associated with night long-distance express trains. No local trains are run on any route, but Princes Street has to deal with the sleeping car train from the south, arriving at 8.0 a.m. the 3.50 p.m. from Perth at 5.55 p.m., the 9.40 p.m. departure for the south, and the 7.0 a.m. for Larbert and the north. There are also workmen's trains at 5.37 a.m. and 5.37 p.m. from Princes Street for employees at Granton Gasworks, with the corresponding return trains at 6.12 a.m. and 6.12 p.m.

It will be seen that Princes Street station affords abundant material of interest. It is never really quiet, except on Sundays, and the fact that it involves a station staff of upwards of 150 indicates that there is always plenty to do, and there are not many quiet moments in its single signal cabin. Besides the regular train movements, empty coaches have to be shunted to and from sidings, or from one platform to another, and engines are regularly running to and from the engine sheds at Dalry Junction. And at holiday periods and during the hours of business travel it oftentimes affords a scene of bustle and life.

As the headquarters of the Edinburgh district the offices of the district traffic superintendent and the engineer and other district officers are located at Princes Street. Mr. Alexander Fulton is District Traffic Superintendent, and to him, with Mr. Thomas Prentice, Station Superintendent, and officers of the Caledonian Railway Company, the writer is indebted for valuable assistance in the compilation of this article, and for facilities for observing the traffic working at Princes Street. Mr. Fulton entered the service of the Caledonian Railway in the District Superintendent's office at Glasgow Central station in 1884, where he spent the first six years of his service. He was transferred to the Superintendent of the Line's office at 302, Buchanan Street, Glasgow, in 1890, serving in the staff and rates departments, and was appointed Chief Rates Clerk in 1902. In 1908 he was appointed Commerical Assistant to the Superintendent of the Line. In 1910 he was appointed Assistant District Traffic Superintendent at Perth, where he remained for a year, before his appointment as District Traffic Superintendent at Edinburgh in 1911.

Mr. Thomas Prentice joined the service of the Caledonian Railway in 1883 at Douglas station, where he was employed for four years. For the next 10 years he was in the booking office at Glasgow Central station, from which office he was promoted to be Stationmaster at Yoker. He has been Stationmaster successively at Stobcross, Glasgow (Central, Low Level), Wemyss Bay, and Glasgow (Buchanan Street) prior to his appointment to be Station Superintendent at Edinburgh (Princes Street) in 1919.

Sept 1923



GLASGOW CENTRAL STATION.

Notable Railway Stations and their Traffic.

GLASGOW CENTRAL STATION, LONDON MIDLAND AND SCOTTISH RAILWAY.

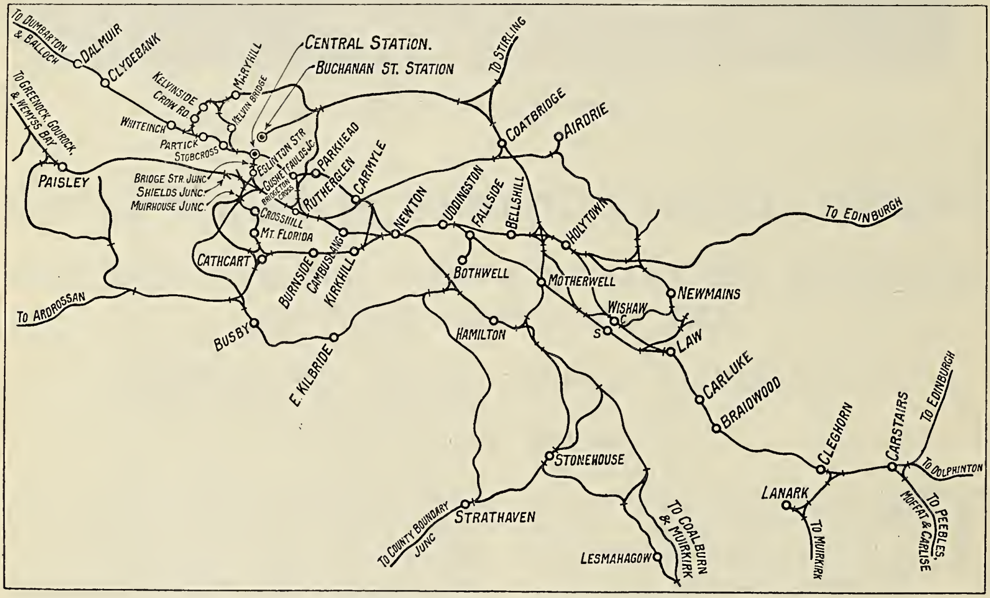
I.—PASSENGER TRAFFIC ROUTES AND SERVICES.

By **CHARLES TRAVIS, M.Inst.T.**

THIS station has already received attention in our earlier "Notable Railway Stations" series (RAILWAY MAGAZINE, January, 1907) at the time it was enlarged to its present capacity, while in the November, 1908, number the electro-pneumatic signalling, then newly installed, was described. Glasgow Central station is, however, so well known as the largest and most interesting of the great Scottish terminal stations, while the original article by the late Rev. J. T. Lawrence, M.A., was somewhat general in character, that it is thought that a new article dealing with this famous station and its traffic on a different basis will be in place.

As explained in the earlier article the original portion of the station dates from 1879, when the first bridge over the Clyde was completed. Until then main line trains from the south used Buchanan Street station, travelling via Coatbridge, while other trains terminated at "South Side" (now the goods depôt), and at Bridge Street, just south of the river, the latter site now being utilised as sidings, &c. There were then eight platforms served by the four lines of the original bridge, while 66 trains arrived and 68 departed in the course of the day. In 1889 No. 9 platform was added, and in 1906 the second bridge over the Clyde was built and platforms Nos. 10, 11, 12 and 13 added. In 1890 358 trains were dealt with daily, which number had increased in 1900 to 466, and in 1912 to 527, reducing, however, as a normal total, to 481 in 1922. The low level station, added on August 10, 1896, is of a through type and deals with about 140 trains on an ordinary day.

The station is notable for the width of its principal platforms, its exceptionally spacious circulating area of some 3,000 square yards extent, designed to serve the platforms *in echelon*, so as to obtain effective passenger distribution, the airy and light interior realised by the roofing scheme, and the remarkable extent and convenience of its underground communications. Total platform length is 2,910 yards. Extreme width is 360 ft. The covered area is 35,278 square yards. Below the main station are the four platforms of the low level line, substantially at right angles to those above, so that, in the aggregate, passengers have the use of 17 platforms, those underground being served by through trains on various suburban routes.



GLASGOW AND DISTRICT LINES.

London Midland and Scottish Railway, Caledonian Section.

From the traffic aspect, as in other respects, the Central station is the most important of the Glasgow railway stations. There are handled all the express and local trains with England, and with Edinburgh and other towns in Scotland; the heavy coast traffics to Greenock, Gourock, Wemyss Bay and the Clyde coast; the extensive residential and business traffic to outlying districts, and a very large suburban traffic to and from places within a 15-mile radius. In normal times about 500 passenger trains arrive and depart from the Central daily. It is computed that the number of passengers using the station—calculating two journeys per day for each season-ticket holder—exceeds 25 millions per annum.

Based on an average working day of 18½ hours between the first train in the morning and the last train at night, these figures are remarkable and scrutiny makes them even more so. In common with all other stations dealing with a voluminous suburban and residential traffic the business over the working day is somewhat uneven, the rush hours in the morning, at mid-day and in the evening being separated by quiet spells, so that half the trains and a like proportion of the passengers are actually dealt with during the six hours rush. In the busiest hour of an ordinary working day the arriving and departing trains total 80, exclusive of the docking of empty carriages and the shunting of engines for the trains. In working movements the docking and shunting work is equivalent to a further 40 trains. The station, with its extensive distributing area and admirable conveniences, is in every way adapted for dealing with the enormous daily volume of traffic, and it may be noted that, on the occasion of the greatest holiday traffic on record 163,000 passengers were booked at the station in one day, irrespective of those passing through.

It is, however, when the lines leading to the Central station and the traffics passing over them are considered that it is seen how the effective organisation of the work involved in the handling of a heavy express, local and suburban traffic can be made to get the utmost out of limited existing running lines. The approach lines to the Central are indeed limited. The main line from Carlisle consists of but a double line of rails to Gushetfaulds Junction, four running lines being then available to the Central station—a little over a mile distant. Along the double track from Carlisle to Carstairs passes all the traffic from Carlisle to Edinburgh, Glasgow and the North. At Carstairs the Edinburgh trains branch off, but this occasions no relief, as more trains, some originating at Carstairs, and others at Lanark join the main line at Cleghorn, two miles to the north, and actually result in a greater pressure on the main line on the northern side of Carstairs than on the southern.

The residential traffic affecting Glasgow makes its first appearance at Beattock, 60 miles out, with the 7.28 a.m. from Moffat, better known as "The Tinto Express." This train is an old time Carlisle to Glasgow "parly," converted into a long-distance residential express, and it maintains a fast all-the-year-round service between Moffat, the Upper Clyde, Peebles, Biggar and Glasgow and Edinburgh. It takes up a portion including a Pullman Breakfast Car from Peebles and Biggar at Symington and leaves off the Edinburgh section at Carstairs. A number of regular travellers from the outlying branches and from Carstairs itself join the "Tinto Express," and the earlier trains there, and the regular travellers from Lanark, together with the daily passengers picked up at Braidwood, Carluke and Law Junction, necessitate two residential trains. From Law Junction the two alternative routes to Motherwell and Uddingston are used by the trains best suited to meet local requirements; an additional residential train is added from here and another two from Wishaw, two miles further on, whence there is a very large residential traffic with Motherwell and Glasgow.

The greater number of the trains from Wishaw Central run over the deviation line to Motherwell, while the others go via Holytown and rejoin the main Motherwell to Glasgow line at Uddingston. At Holytown, the residential traffic with Glasgow receives an acquisition in the Edinburgh to Glasgow express and local trains and an influx of city-going passengers from the Newmains branch. The trains running from Carstairs and Lanark via Motherwell are inadequate for the Glasgow traffic emanating at Motherwell, so additional residential trains have to be added from that point, some running via Bellshill along with other trains to meet the demands of that town and others proceding via the main line direct to Uddingston. At Fallside, a mile short thereof, three residential morning trains from Bothwell are added to the now numerous trains making towards Glasgow. The Bothwell trains, and the trains from more distant places running via Motherwell and via Holytown also serve Uddingston, where the daily travellers number many hundreds. At Newton, the next station, there is also a large suburban traffic and the morning group of trains with Glasgow business people is swollen by half-a-dozen from Coalburn, Lesmahagow, Stonehouse, Strathaven and Hamilton. A train or two here is diverted to the Underground line via Carmyle and Parkhead, and to the Cathcart Circle line to serve Kirkhill and Burnside, but in volume the number of trains passing hence to Rutherglen during the rush hours fully taxes the capacity of the one double line. There is also the important suburban station of Cambuslang to serve intermediately, and at this place the season-ticket holders number 1,355, while there is a large volume of ordinary passenger traffic.

The only line joining this busy stretch of track is that from Coatbridge and Airdrie, this converging between Cambuslang and Rutherglen, but with the opening of the Central Underground line the trains between those points and the City were diverted to it, and the passenger trains on this connecting line are now restricted to one early morning train to the north and two late evening trains from the north. At Rutherglen, which is one of the two eastern inlets to the Central Underground Railway, a number of the trains pass on to that line, yet despite this the number continuing on the main line to Eglinton Street and Glasgow Central is sufficient during the busy morning, midday and evening hours to maintain an

THE CONCOURSE, GLASGOW CENTRAL STATION.

uninterrupted succession of trains through the section.

The Polmadie engine sheds of the company, at which most of the engines working the trains into and out of the Central are stationed, are situated between Rutherglen and Eglinton Street, and the necessary engine movements add materially to the occupancy of the line, as also does the traffic to the Larkfield carriage sheds, from which point, however, two up and two down lines are available. From Eglinton Street Junction to Bridge Street Junction the main line trains share the four sets of rails with the trains from the Cathcart Circle Railway, Ardrossan, East Kilbride and Burnside and from Bridge Street Junction the ten passenger lines to the Central are also shared with the trains to and from the Gourock and Wemyss Bay section.

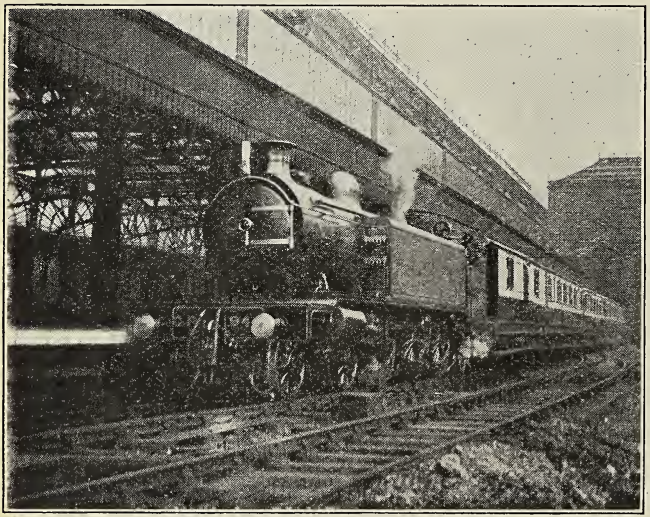
The Cathcart Circle Railway consists of an Inner and Outer Circle, with 10 intermediate stations, and, as already mentioned, detaches itself from the main line at Eglinton Street Junction. Like all inner suburban lines it is particularly susceptible to abnormal traffics at the morning, noon and tea hours, there being very quiet spells between the rush periods. The general arrangement is a 15-min. service on both arms of the Circle in the forenoon, afternoon and late evening, with a 10-min. service between 8 a.m. and 10 a.m.; 12 noon and 2 p.m.; and 4 p.m. to 7 p.m. The 10-min. service is, however, augmented by many auxiliary trains at the busy hours of the rush periods—the service at certain times on both Circles being equal to a 3-min. one. The Circle service carries, on the average, 7,000 season-ticket holders, who for the most part make three double journeys daily between their home station and Glasgow Central, and there is also a large number of ordinary passengers.

The Cathcart Circle Railway is subject only to three diverging lines throughout its length. The trains for Burnside and Kirkhill and on to Newton diverge at Mount Florida, and the Ardrossan trains at Cathcart on the Outer Circle, while trains to and from Busby and East Kilbride leave and join the Inner Circle at Muirhouse Junction. The Burnside trains are few in number and a burrowing junction, passing under the Cathcart Circle Railway and used by in-going trains without interference with the Cathcart Circle trains, minimises interruption to the main service. The Ardrossan service never exceeds some 15 regular trains—a steady suburban traffic from the nearer stations comprising the bulk, the war years having retarded the residential development of the highly promising pastoral district further out—and existing services are conveniently arranged to dovetail in with the Circle services proper.

As well as the big daily suburban traffic the Cathcart Circle Railway has to cope with occasional abnormal volumes of traffic, as Mount Florida is the station for Hampden Park, where all the national and international football matches are played. Moreover, Crosshill, the next station, is adjacent to Cathkin Park and the ground of the Third Lanark Football Club. It is somewhat fortunate that, except in the case of the international match between Scotland and England, when the trek of the hundred thousand odd spectators from the city begins at about 11 a.m., the football rush generally does not begin until the ordinary Saturday mid-day migration to the suburbs is over, the one being therefore clear of the other. The big games are also reflected in the traffic on other sections as, in addition to the 34 special trains engaged on the last occasion exclusively in taking the football "fans" between Glasgow (Central) and Mount Florida for important matches, 45 trains from and to the outlying districts were dealt with at other of the Caledonian Glasgow stations. In some instances 30,000 passengers have been dealt with at a local station in four hours.

The third and last of the approaches to Glasgow (Central) is the line from Wemyss Bay, Gourock and Greenock, which joins at Bridge Street Junction, a quarter of a mile out from Central and for convenience in working the trains from and to this section are invariably dealt with at Nos. 13, 12 and 11 platforms. They are thus kept clear of other trains passing to and from the station. On the Gourock and Wemyss Bay section there is a very heavy residential and coast traffic throughout the year—naturally more dense in the summer season—and the remarkable feature is that the flow is much the same in both directions. When the summer visitors have added their thousands to the regular travellers by the morning trains from the coast termini to the City, the morning travellers to the coast are correspondingly increased by the influx of additional excursionists bound for a day at the several coast resorts, or for the many pleasure sailings on the Firth of Clyde.

The flow of the large inter-town traffic between Glasgow, Paisley and Greenock, which is of regular volume and less susceptible to seasonable influences, is also fairly equally distributed in both directions. Against a particularly heavy goods and mineral traffic on this section, there are decided working advantages in the fact that four lines are available between Shields Junction and Paisley, and that the level line between Glasgow and Gourock readily admits of fast running with heavy trains, this meaning that fewer trains are required than would be the case on other sections.



CLYDE COAST EXPRESS IN GLASGOW CENTRAL STATION.

At the busy hours the tickets of passengers in many of the trains for Glasgow (Central) are collected on arrival there, this saving the time and occupancy of the lines which calls at the usual ticket collecting stations would involve. This is an important factor in smooth and punctual working, but an even greater one is the careful organisation and arrangement of the services and the careful supervision of every detail of the working between Glasgow (Central) and the points where the trains originate. An intensive system of docking and dealing with the trains at Glasgow (Central) also helps to ensure punctual working. An extract from the platform arrangements notice controlling the working at the station is reproduced on page 175.

All other movements necessitated by extra vehicles in the way of horse-boxes, vans, carriages, &c., are provided for on the same intensive principle, and as the outcome of this and the careful scrutiny of each day's working, the services to and from the Central have a splendid record for punctual train arrivals and departures.

The Central Underground Railway serves many purposes. It relieves the over-burdened main line approach to the High Level station of all the local trains from and to Airdrie, Coatbridge and Bothwell, and a number from and to Hamilton and Motherwell; it furnishes a regular and rapid service from Carmyle and Rutherglen on the east of Glasgow to Partick, Kelvinbridge, Kelvinside and Maryhill on the one hand and to Whiteinch, Clydebank, Dalmuir, Dumbarton and Balloch on the other.

The two lines from the east join at Bridgeton Cross and go through Glasgow Green, Glasgow Cross, Central Low Level, Anderston Cross, Stobcross (where a line goes direct to Maryhill via Kelvinbridge, Botanic Gardens and Kirklee), Partick (Central) to Partick (West). Here the Clydebank, Dumbarton and Balloch trains pass on to the Lanarkshire and Dumbartonshire Railway, and those for Maryhill via Partick proceed there via Crow Road and Kelvinside. The line is under or near the main street of the City running east and west, and is much in use as a speedy means of point to point transit within the City. There is also a large suburban traffic on the line within Glasgow proper and from Airdrie and Coatbridge, Clydebank, Dalmuir, Dumbarton, Balloch and intermediate stations. The service is arranged so that regular and frequent trains are maintained between Rutherglen and Maryhill, such trains serving the whole underground section, and this service is provided both by local trains originating and terminating at the two points and by trains from and to the outer districts.

The traffic between Glasgow and Clydebank, Dumbarton and Balloch is particularly heavy. The major traffic on this section is workmen's, and under normal conditions as many as 28 trains are required daily, the number of workers conveyed being about 23,000. The stations are all practically next door to the yard gates, and until the adoption of the universal rates for such tickets, the workmen's fares on the section were the cheapest in Great Britain, the workers being conveyed between Rutherglen and Kilbowie, a distance of 10 miles, for 1*s.* per week, and to Dumbarton—17 miles—for 2*s.* per week. The existing fares are, Glasgow and Clydebank, 3*s.* per week, and Glasgow and Dumbarton 4*s.* per week. In the season a heavy holiday traffic is carried by the line to Balloch for Glasgow's new public park there and in connection with the Loch Lomond steamers.

The average number of trains dealt with at Glasgow Central (Low Level) station is about 140 per day.

[A companion article describing the station itself and how traffic is dealt with will be published next month.—Ed. R.M.]

EXTRACT FROM PLATFORM ARRANGEMENTS SCHEDULES, GLASGOW CENTRAL STATION.

2

ARRIVALS.

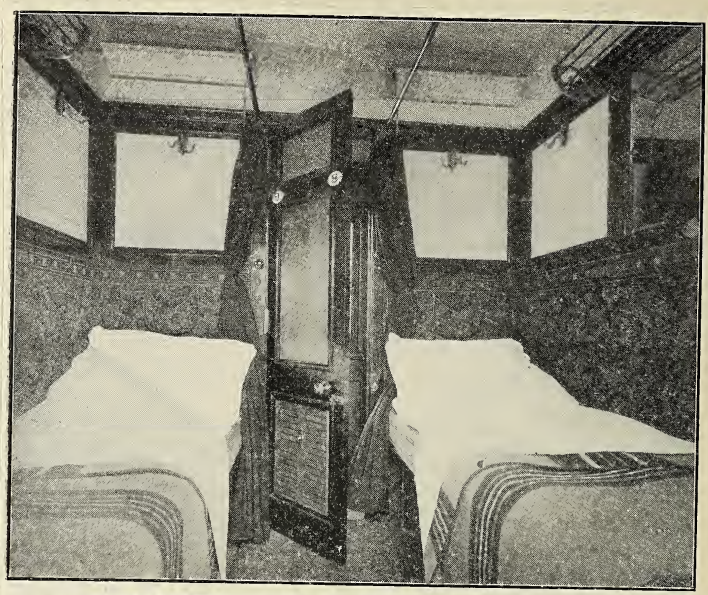
Train.	From	Line.	Due.	Platform.	Carriages to	Engine to
p.m.			a.m.			
7 46	*Larkfield*	1	*8 0*	2	*Carlisle 10.0 a.m.*	**P**
7 25	Cathcart Inner ...	2 & 3	8 11**T**	8	Cathcart Inner 8.22 a.m.	Cathcart 8.30 a.m.
6 20	Edinburgh	1	8 11**T**	3	*d*Edinburgh 8.40 a.m.	Edinburgh 9.50 a.m.
7 50	Cathcart Inner ...	2	8 23**T**	7	Cathcart Outer 8.30 a.m.	Cathcart 8.34 a.m.
7 50	East Kilbride ...	2	8 27**T**	6	Kirkhill 8.32 a.m.	Hamilton 8.50 a.m.
7 58	Cathcart Outer ...	2 & 3	8 30**T**	8	Cathcart Inner 8.34 a.m.	Cathcart 8.55 a.m.
8 6	Kirkhill	2 & 3	8 33**T**	9	Cathcart Outer 8.40 a.m.	East Kilbride 9.9 a.m.
7 10	Gourock...	5	8 34**T**	13	Smithy Lye 8.38 a.m.	Smithy Lye 8.38 a.m.
8 3	Bothwell	1	8 35**T**	1	Rutherglen 8.43 a.m., *via* No. 3 Loop **S** ... ... No. 2 Siding 8.40 a.m. **S O**	Rutherglen 8.43 a.m. **S** No. 2 Siding 8.43 a.m. **S O**
8 9	Patterton	2	8 37**T**	5	Strathaven 8.50 a.m.	Larkfield 8.52 a.m.
8 10	East Kilbride ...	2 & 4	8 39**T**	10	Smithy Lye 8.42 a.m.	Cathcart 8.53 a.m.
7 55	Strathaven	1	8 40**T**	Top 2	Bell's Yard 8.50 a.m.	Smithy Lye 9.5 a.m.
8 18	Cathcart	2 & 3	8 41**T**	7	Cathcart Outer 8.55 a.m.	Cathcart 9.14 a.m.
7 40	Gourock...	4 or 5	8 42	12	Smithy Lye 8.45 a.m.	Smithy Lye 8.45 a.m.
7 54	Wishaw (Central)	1	8 44**T**	4	Larkfield 8.52 a.m.	No. 1 Siding 8.55 a.m.
8 34	Mount Florida ...	2 & 3	8 45**T**	9	Cathcart Inner 8.53 a.m. and Spares Smithy Lye 8.55 a.m.	Smithy Lye 8.55 a.m.
7 29	Coalburn	1	8 48**T**	3	No. 1 Siding 8.55 a.m.	Hamilton 9.25 a.m.
8 31	Muirend...	2 & 3	8 48**T**	10	No 4 Siding 8.50 a.m.	No. 4 Siding 8.50 a.m.
8 25	Burnside	1	8 50**T**	1	No. 3 Loop 8.52 a.m. **S** ... ... Larkfield 8.52 a.m. **S O** ...	No. 3 Loop 8.52 a.m.
7 47	Wemyss Bay ...	5	8 51	13	Smithy Lye 8.58 a.m.	Smithy Lye 8.58 a.m.
7 38	Ardrossan	2 & 3	8 53	11	East Kilbride 9.9 a.m.	Larkfield 9.10 a.m.
7 55	Lanark	1	8 55**T**	1	Lanark 9.8 a.m.	Carstairs 10.25 a.m.
8 26	Busby	2 & 4	8 56**T**	10	Smithy Lye 9.10 a.m.	Smithy Lye 9.10 a.m.
8 34	Cathcart...	2 & 3	8 58**T**	Top 10	Smithy Lye 9.2 a.m.	Smithy Lye 9.2 a.m., then to Gushetfaulds for 9.45 a.m. Stock.
8 0	Carstairs	2 & 1	9 0**T**	3	Larkfield 9.10 a.m.	Larkfield 9.21 a.m.
8 22	Cathcart Inner ...	2 & 3	9 1**T**	9	Smithy Lye 9.5 a.m.	Cathcart 9.30 a.m.
8 15	Gourock	5	9 2	12	Gourock 9.30 a.m.	Polmadie
8 30	Cathcart Outer ...	2 & 3	9 5**T**	5	Cathcart 9.14 a.m.	Smithy Lye 9.22 a.m. **S** No. 3 Loop 9.22 a.m. **S O**
8 34	Cathcart Inner ...	2 & 3	9 8**T**	7	Cathcart Outer 9.20 a.m.	Polmadie.
8 17	Stonehouse	1	9 8**T**	4	Smithy Lye 9.22 a.m. **S**; and No. 3 Loop 9.22 a.m. and Hamilton 9.25 a.m. **S O** ...	Larkfield, light
8 22	Strathaven	1	9 11**T**	1	Hamilton 9.25 a.m.	Eglinton Street
8 45	Busby	2 & 4	9 12**T**	9	Smithy Lye 9.15 a.m.	Smithy Lye 9.15 a.m
9 10	*Smithy Lye*	2	*9 16*	5	*Edinburgh 9.50 a.m.*	Gourock 11.5 a.m.
8 20	Lanark	2 & 1	9 15**T**	3	Larkfield 9.21 a.m.	Lanark 10.28 a.m.
8 39	Neilston...	2 & 4	9 16**T**	13	Smithy Lye 9.20 a.m.	Smithy Lye 9.20 a.m.

T Tickets collected at Central. *d* Draw.

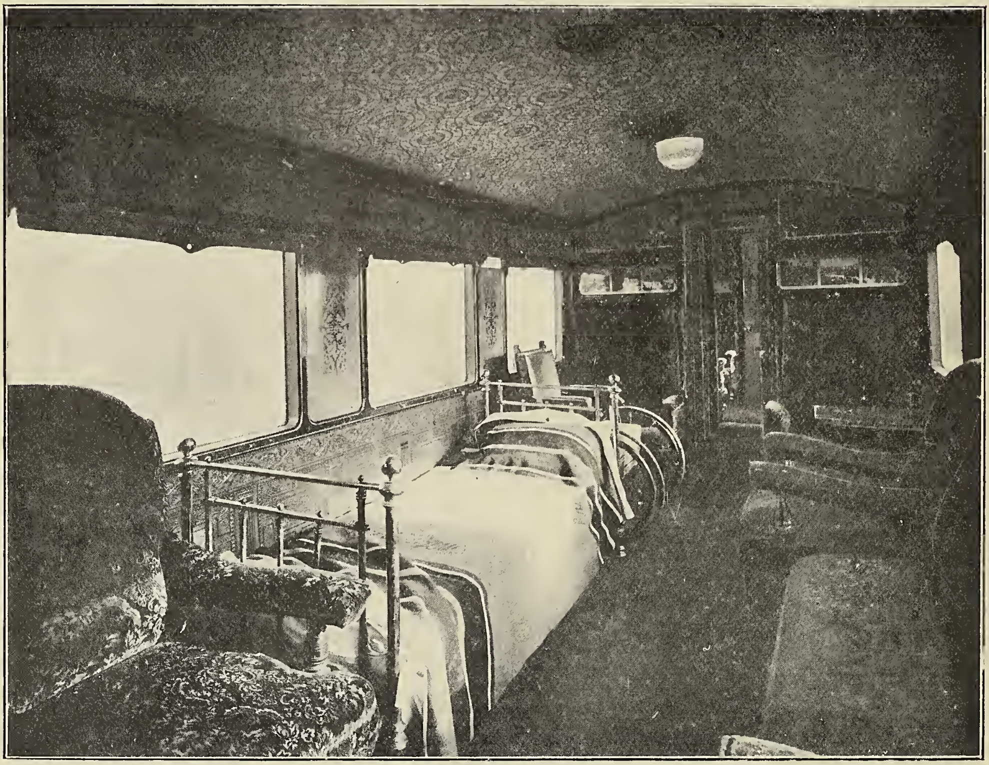
3

DEPARTURES.

Train.	To	Platform.	On Line	Carriages from	Engine from
a.m.					
7 30	*Smithy Lye*	2	2	*Motherwell 6.34 a.m.* **M O**; *6.42 a.m.* **M**. *Spares*	*Carstairs 4.52 a.m.* **M**; *light 5.30 a.m.* **M O**
7 30 **M**	*Lorkfield*	11	4 & 1	*Carlisle 4.10 a.m.*	**P**
7 35	*Burnside*	*No. 2 Siding*	2	*Homilton 7.10 p.m.* **S** ... ... *Shotts 10.5 p.m.* **S O**	*Polmadie 7.5 a.m.*
7 35 **M O**	*Busby*	9	8 & 2	*East Kilbride 10.13 p.m.*	*Polmadie 7.5 a.m.*
7 40	Wemyss Bay ...	13	5	Smithy Lye 6.45 a.m.	Polmadie 7.0 a.m.
7 40 **M O**	*Larkfield*	11	4 & 1	*Carlisle 4.38 a.m.*	**P**
7 50	Cathcart Inner ...	8	3 & 2	Cathcart Outer 7.15 a.m.	Motherwell 6.42 a.m. **M**; 6.34 a.m. **M O**
7 55	East Kilbride ...	4	2	East Kilbride 6.55 a.m.	Cathcart 6.40 a.m.
7 58	Cathcart Outer ...	7	3 & 2	Neilston 7.17 a.m.	Polmadie 7.30 a.m.
8 0	Ardrossan	9	3 & 2	Kirkhill 11.14 p.m.	Cathcart 7.15 a.m.
8 0	Gourock...	12	5	Gourock 6.38 a.m.	Smithy Lye 7.25 a.m.
8 4	*Cathcart*...	*No. 2 Siding*	2	*Uplawmoor 7.17 p.m.* **S** ... ... *Coalburn 11.40 p.m.* **S O**	*East Kilbride 6.55 a.m.*
8 5	*Cathcart* ...	*Via Bridge Street Jun.*	2	*Smithy Lye 8.5 a.m.*...	*Polmadie 7.30 a.m.*
8 8	Lanark	6	2	Cathcart Outer 7.20 a.m.	Smithy Lye 7.45 a.m. (Carstairs 4.52 a.m.)
8 8	*Cathcart (West) Junction* ...	10	3 & 2	*No. 6 Loop 6.45 a.m.*	*Polmadie 7.30 a.m.*
8 10 **M**	*Larkfield*	11	4 & 1	*Carlisle 5.8 a.m.*	**P**
8 13	Edinburgh	1	1 & 2	Motherwell 6.34 a.m. **MO**; 6.42 a.m. **M**	Polmadie 7.45 a.m.
8 22	Cathcart Inner ...	8	3 & 2	Cathcart Inner 7.25 a.m.	Cathcart 7.20 a.m.
8 30	Cathcart Outer ...	7	2	Cathcart Inner 7.50 p.m.	Cathcart 7.25 a.m
8 32	*Kirkhill via Carmyle*	6	2	*East Kilbride 7.50 a.m.*	*Polmadie 8.0 a.m*
8 35	Gourock	12	5	Smithy Lye 7.25 a.m. *via* No. 8 Loop ...	Gourock 6.38 a.m
8 34	Cathcart Inner ...	8	3 & 2	Cathcart Outer 7.58 a.m.	Cathcart 7.50 a.m.
8 38	*Smithy Lye*	13	5	*Gourock 7.10 a.m.*	*Gourock 7 10 a.m.*
8 40	Edinburgh	4	1	Edinburgh 6.20 a.m.	Neilston 7.17 a m
8 40	Cathcart Outer ...	9	3 & 2	Kirkhill 8.6 a.m.	Eglinton Street.
8 42	*Smithy Lye*	10	4	*East Kilbride 8.10 a.m*	**P**
8 43	*Rutherglen via No. 3 Loop* **S** ... ... *No. 2 Siding via No. 3 Loop* **S O**	1	1	*Bothwell 8.3 a.m.*	*Bothwell 8.3 a.m*
8 45	*Smithy Lye*	12	5	*Gourock 7.40 a.m.*	*Gourock 7.40 a.m.*
8 50	*Bell's Yard*	2	1	*Strathaven 7.55 a.m.*	**P**
8 50	Strathaven	5	2	Patterton 8.9 a.m.	East Kilbride 7.50 a.m
8 50	*No. 4 Siding*	10	3	*Muirend 8.31 a.m.*	*Muirend 8.31 a.m*
8 52	*Larkfield*	4	2	*Wishaw 7.54 a.m.*	*Patterton 8.9 a.m.*
8 52	*No. 3 Loop* **S**; *Larkfield* **S O**	1	1	*Burnside, 8.25 a.m.*...	*Burnside 8.25 a.m.*
8 53	Cathcart Inner ...	9	3 & 2	Mount Florida 8.34 a.m.	East Kilbride 8.10 a.m
8 55	*No. 1 Siding*	3	1	*Coalburn 7.29 a.m.*	*Wishaw (Central) 7.54 a m*
8 55	*Smithy Lye*	9	4	*Spares off 8.34 a.m. Mount Florida* ...	*Mt. Florida 8.34 a.m.*

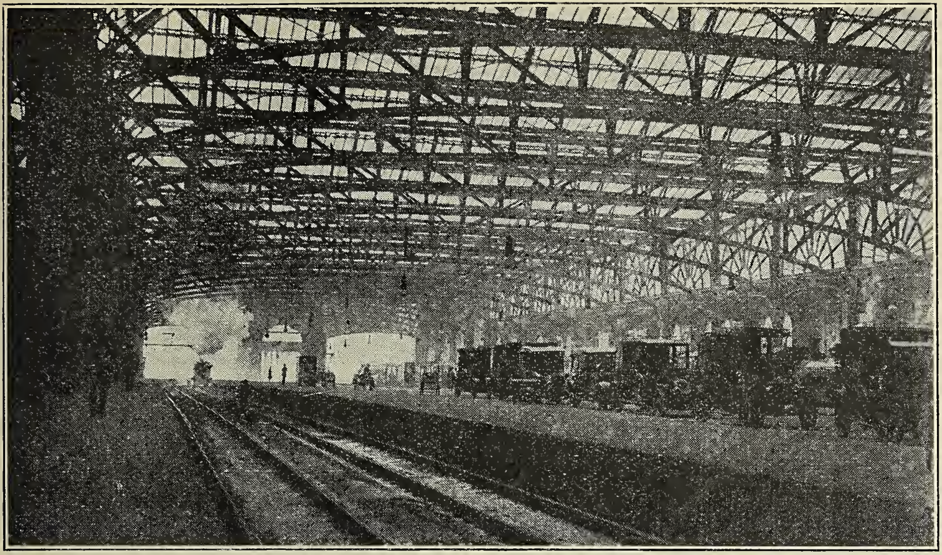


DOUBLE BERTH COMPARTMENT IN SLEEPING CAR: WEST COAST JOINT STOCK.



CALEDONIAN RAILWAY.
Interior of Invalid Saloon, showing (beyond the bedstead) the self-propelling wheel chair.

Oct: 192



GENERAL VIEW OF PLATFORMS Nos. 11, 12 & 13.

Notable Railway Stations and their Traffic.

GLASGOW CENTRAL, LONDON MIDLAND AND SCOTTISH RAILWAY.

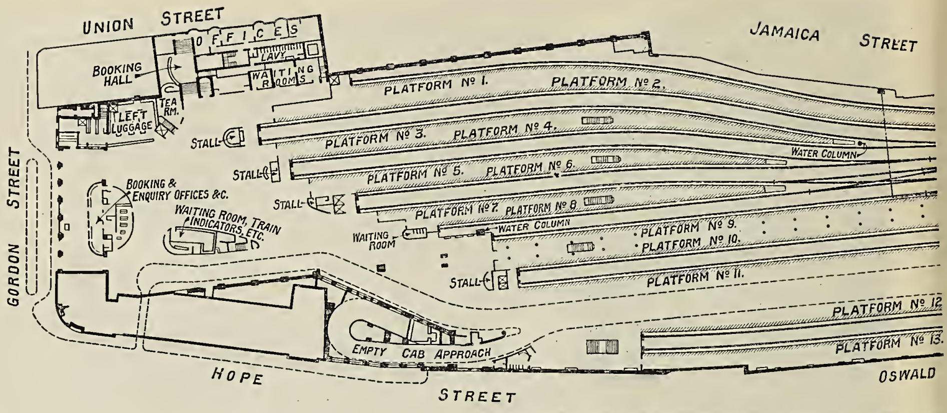
II.—THE STATION AND TRAFFIC ARRANGEMENTS.

By J. F. GAIRNS.

THE principal facts concerning the station and the characteristics of the traffic dealt with there, were described last month by Mr. Charles Travis. In this article the station itself is described.

Considering, for the present, only the terminus, the 13 platforms are usually allocated to particular sections of traffic, a practice adopted wherever practicable all over the late Caledonian system, and one which, in regard to suburban traffic, has much to commend it, in that regular passengers can proceed direct to the platforms they require without enquiry or halting to consult the train indicators. Nos. 1 and 2 usually accommodate main-line trains for the south, including the principal expresses for London, Manchester, Liverpool, &c. No. 2 is also used for main-line stopping trains; Nos. 3 and 4 for Edinburgh express and stopping trains; Nos. 5 and 6 for Wishaw and Hamilton and other local trains; No. 7 for Cathcart "Outer Circle" trains; No. 8 for Cathcart "Inner Circle" trains; and Nos. 9 and 10 for East Kilbride and Ardrossan trains. Nos. 10 and 11 are the principal main-line arrival platforms, while Nos. 12 and 13 are used chiefly for Greenock, Gourock, Wemyss Bay and other "Coast" trains. Except for Nos. 1 and 2, which are almost exclusively utilised as departure platforms (Nos. 10 and 11 being similarly devoted to main-line arrivals), the platforms are utilised for both arrivals and departures, and even those excepted can be, and at times are, so used.

All platform lines are connected either with the four original tracks carried by the old bridge or the nine lines placed upon the second bridge. Except for crossovers and connections, the lines on the original bridge provide two sets of up and down

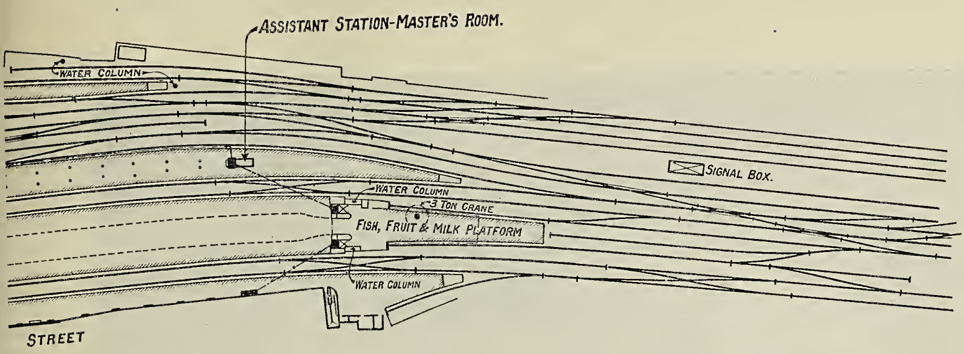


LAY-OUT OF PLATFORMS AND LINES AT

lines, known, respectively, as Nos. 1 and 2 up and down lines. On the newer bridge, however, there is a wide range of connections and crossovers and one or two terminal engine lines associated with Nos. 3, 4 and 5 pairs of up and down lines, together with a few siding sections or shunting necks. It frequently happens that three trains arrive and three depart almost, if not quite, simultaneously, and shunting movements can also be going on at the same time. The arrangement of approach lines and the very comprehensive series of track connections and interconnections at each end of the bridge and upon the newer section is, however, far too complicated for description without the aid of a diagram, and the plan reproduced must, therefore, be allowed to suffice in this respect. South of the bridge, and adjacent to Bridge Street Junction box, a number of sidings are provided, there being, in fact, at one point no fewer than 17 roads, including sidings and loops.

No. 1 platform has a short "lie-by," known as Coliseum siding, at its outer end, in which a spare or shunting engine can be placed. No. 1 platform is only connected directly with No. 1 Up and Down lines. No. 2 set of up and down lines can be reached at the south end of the old bridge, thus affording connection with the Glasgow and Paisley Joint line at Bridge Street Junction. No. 2 platform is similarly restricted in regard to its whole length, but some 40 yards short of the end of the platform there are connections to the new bridge system of lines. Nos. 3, 4, 5 and 6 platforms are relatively short, and they are thus able to connect with most lines on both bridges. Nos. 7 and 8 have about the same length, and as they are chiefly utilised for the frequent Cathcart "Circle" services an engine siding is provided to serve both. Platforms 9 to 13 are accessible only via the new bridge Nos. 9 and 10 platforms are of considerable length, extending beyond the station roofing on to the bridge itself. Between platforms Nos. 11 and 12 there is a wide carriage road, thus rendering No. 11 particularly suitable for the arrival of important express trains from England requiring to be served by considerable numbers of taxi-cabs and involving heavy luggage transfer, while No. 12 is similarly convenient for the arrival of the more important coast and Clyde steamer trains which also, in the season, bring many passengers accompanied by luggage and requiring cabs. This section of the station is covered by an extension of the roofing system, and its outer end on the new bridge has a double-sided loading bank equipped with a crane and other conveniences, and roofed over independently of the general station roofing. No. 13, alongside the boundary wall, is also extended on to the bridge, and at its outer end has a short dock.

As already mentioned, and as will be seen from the plan reproduced, the platforms are arranged *in echelon*, that is, they terminate on a diagonal system, thus obtaining a passenger distribution which could not be realised were all the buffer stops in line. This arrangement, in conjunction with the necessarily complicated and irregular track lay-out, and the way in which the platforms are grouped

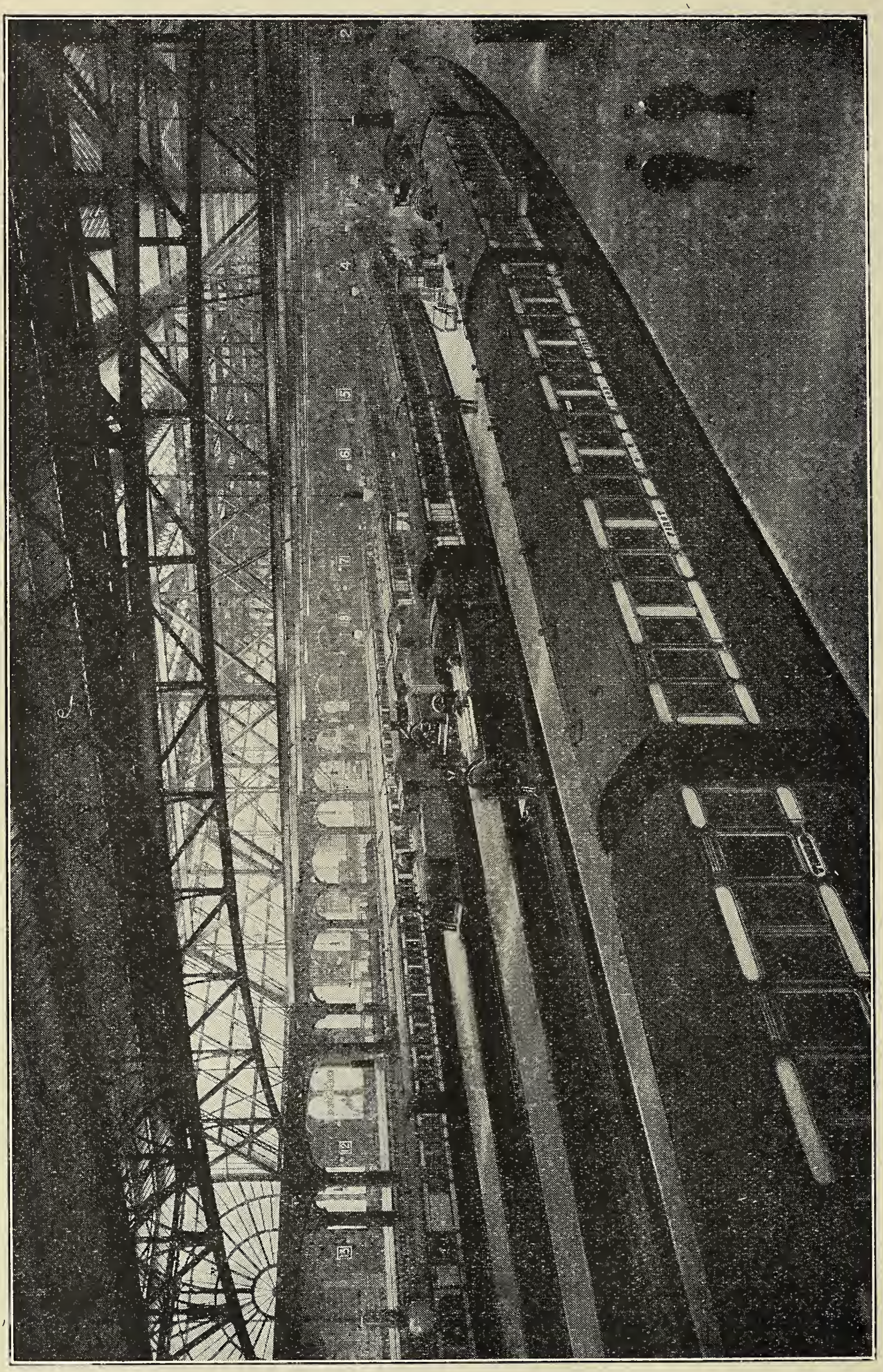


GLASGOW CENTRAL (HIGH LEVEL) STATION.

together, causes the platforms to vary greatly in length, as follows:—No. 1, 794 ft.; No. 2, 900 ft.; No. 3, 615 ft.; No. 4, 578 ft.; No. 5, 503 ft.; No. 6, 432 ft.; No. 7, 433 ft.; No. 8, 346 ft.; No. 9, 954 ft.; No. 10, 923 ft.; No. 11, 812 ft.; No. 12, 680 ft.; and No. 13, 809 ft. Although some of these are relatively short, there are sufficient long platforms to accommodate the chief main-line trains and other services which load heavily, while the shorter platforms meet all ordinary requirements.

The signalling is entirely electro-pneumatic, on the Westinghouse Brake and Saxby Signal Company's system. The entire working of the station is concentrated in one signal cabin, carried on the adjacent girders of the old and new bridges. This replaces three manual cabins previously employed. All levers are of miniature type—7 in. high—placed on a raised frame running longitudinally along the cabin, and there is a through passage in the middle of the frame dividing it into two sections. A large illuminated diagram is suspended diagonally from the roof, and on a ledge over the lever frame are the various instruments, indicators, &c. At one end, placed transversely so as to be visible by all the signalmen, is an indicator operated from the platforms, showing in illuminated figures when a train is ready to depart. A similar indicator is provided at the other end of the signal-box describing approaching trains, and showing the lines on which they will arrive. Numerous other indicators, &c., are provided to aid the signalmen in the manipulation of the traffic. Several of the lines are track-circuited, and a system of "route" locking is in operation between the home signals and the platforms, while each platform has a system of locking operated by balanced bars showing the occupation of the platform lines. Where platforms are long enough to accommodate two trains the inner and outer sections are separately safeguarded. An important feature is that route-indicating signals are extensively employed, thus reducing the number of arms which would have to be provided. Speaking generally, each platform has a main starting signal and a shunt arm below it for departing trains, with an indicating casing showing the number of the line on which the train is to travel. Where intermediate connections occur in the case of long platforms, signals are provided there as well as at the outer ends. The outer home signals at the south end of the bridge have indicators which show the line over which the train will pass and the inner home signals have indicators showing the number of the platform at which it will arrive.

For shunting movements on to the bridges the letter "S" is shown on the indicators. Dwarf and other auxiliary signals for shunting purposes are, of course, provided in the station on the approach lines as required. At night, when the signals are at danger, the indicators alongside them show "white light" triangles outlined by small holes. For the crossover roads entirely within station limits, six dwarf lever frames are provided, and these control the crossovers at the terminal ends of Nos. 2 and 3, 4 and 5, 10 and 11, and 12 and 13 platforms,



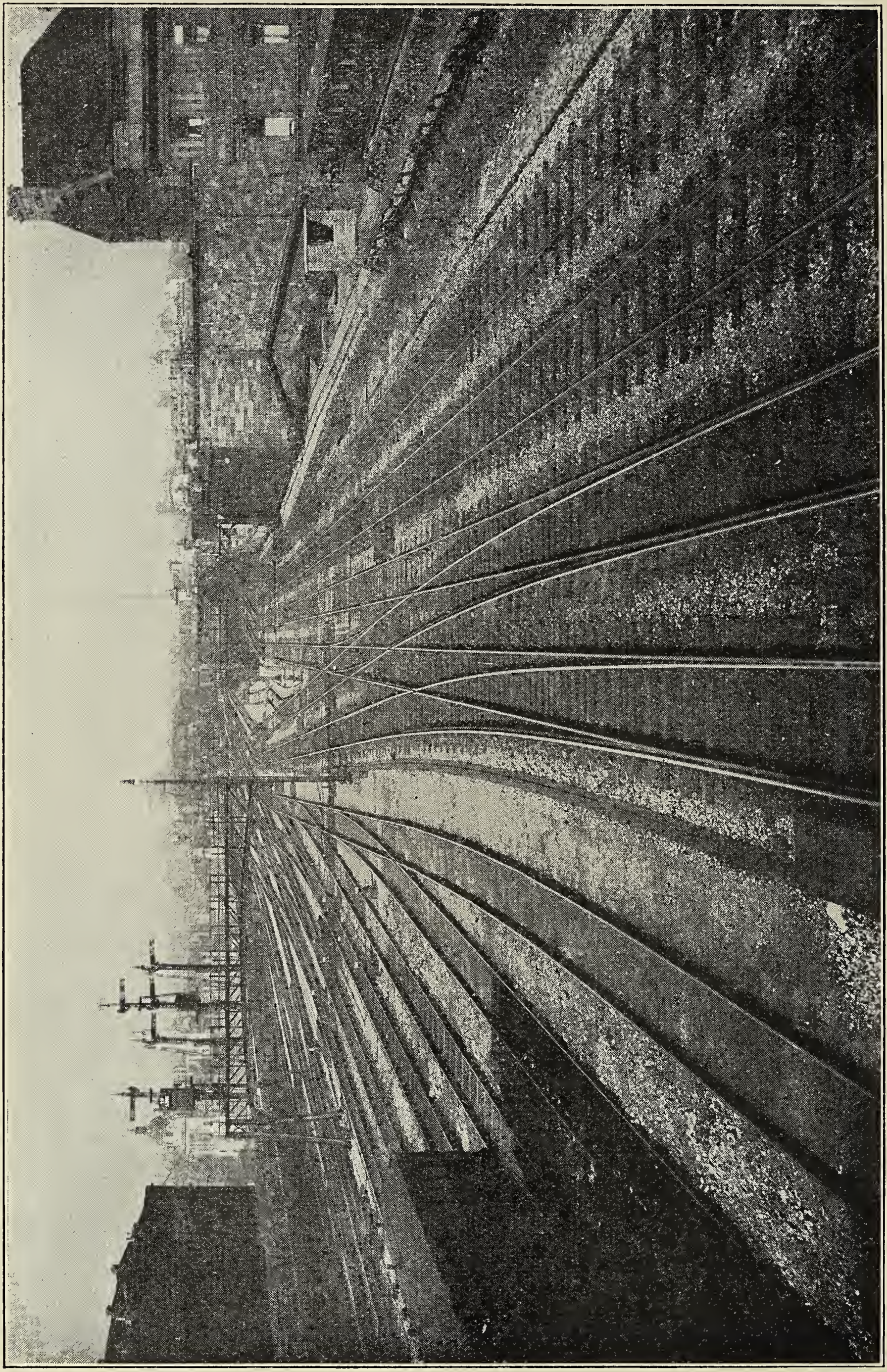
GENERAL VIEW OF INTERIOR OF GLASGOW CENTRAL STATION.

and at the outer ends of Nos. 10 and 11 and 12 and 13. These are operated by the station staff and are controlled from the signal box. The main signal frame contains 374 levers, 258 for signals, 79 for points, and 37 spare. It may be mentioned that the next cabin, at Bridge Street Junction, is of mechanical type, having 160 levers, of which 131 are in use.

Perhaps more than any other " Central " station, this terminus justifies its title, in that it is bounded on three of its sides directly by three of the principal thoroughfares of the city, and its immediate vicinity is, to all intents and purposes, the starting point of the exceptionally complete system of tramways operated by the Glasgow Corporation. The main entrance is from Gordon Street, a short thoroughfare connecting Buchanan, Union and Hope streets. The Gordon Street frontage has a courtyard protected by a glazed roof, and gives access to the main booking office. Here is also the principal block of the Glasgow Central Station Hotel buildings, this hotel ranking as one of the largest and best and most important in Glasgow. There is also a busy entrance by stairways from Union Street, leading direct to the circulating area, while access for vehicles only can also be had from Hope Street via a carriage-way following a curved path to reach the roadway between platforms Nos. 11 and 12. There are also two entrances from Hope Street, one leading to the north end of the concourse and the other to the ends of platforms Nos. 12 and 13. From Argyle Street there are two other entrances, both with booking halls, one on the east side of the bridge or covered way, which carries the station across Argyle Street, and the other on the west side, at the corner of Argyle and Hope streets. Both of these connect with a system of passages leading also to the Low Level station, while stairways give direct access to all platforms except Nos. 1 and 2, which can only be reached from the main circulating area.

Dealing first with the main booking hall, on entering from Gordon Street there is an office for booking luggage in advance and a Lost Property Office connecting with the Left Luggage Office, which continues it on to the circulating area. In the hall itself, a range of booking windows is provided, and behind this is a curved range of offices between two wide passages providing for access from the booking hall to the circulating area, including a Public Enquiry Office, an office for reserving seats and sleeping berths, and several auxiliary booking windows. Passing on to the main circulating area, beyond the Left Luggage Office on the left-hand side (a large department having three public counters and connected by hoists with storage premises below) a stairway may be noted, leading to the stationmaster's and the Season Ticket offices above and also communicating with a range of offices occupied by the District Superintendent, Mr. John Mason, and his staff. Next to this stairway is a large tea room (with extension premises on the floor below) which is very popular with Glasgow residents as well as with travellers. It also has a public entrance direct from Union Street. Alongside this is the stairway access from Union Street already mentioned, and in this fruit, confectionery and tobacco stalls are situated. On the other side of this stairway, and leading towards the end of No. 1 platform, is a range of premises including a general refreshment room, and ladies' and gentlemen's waiting rooms ; also a stairway to a Low Level lavatory which extends transversely from side to side of the station at this point. Over these are premises including a conference room, guards', inspectors' and ticket collectors' rooms and an employees' restaurant. Below them, fronting upon Union Street, are several shops, one of which is utilised as a parcels receiving office for the Caledonian Railway Company, others being let out to tradespeople.

To the right of the booking hall, entrances are provided to the Central Station Hotel above this part of the station and extending for a considerable distance along Hope Street. Between the roadway leading up from Hope Street to the cab rank between platforms Nos. 11 and 12, and the main circulating area, is a torpedo-shaped block of buildings. On the circulating area side of these buildings may be noted first a public telegraph office, then an office occupied by the Glasgow representative of the Pullman Car and International Sleeping Car Companies, Mr. C. M. Trott. Next is a shop parcels office, and beyond it a bookstall. On the roadway side of this block there is a letter room for dealing with the



THE APPROACH TO GLASGOW CENTRAL STATION.

arrival and despatch of railway letters and, at the end, a stairway forms another entrance to the Low Level lavatories previously referred to. Above this block the outstanding feature is the well-known series of train information windows, from which are exhibited announcements as to the departure of trains from various platforms. These are readily visible from all parts of the circulating area and constitute one of the most useful features of the station equipment, in that passengers only need to glance up and proceed directly to the platforms they require. Behind are various staff offices. Lined along the platform side of the circulating area may be noted the well-known semi-circular book-stall, surmounted by an artistic clock tower, behind the buffer stops of platforms Nos. 2 and 3 ; confectionery, fruit and tobacco stalls behind the buffer stops of Nos. 4 and 5 ; tobacco stall and inspectors' and other staff offices adjacent to the ends of platforms Nos. 6, 7 and 8 ; a ladies' room at the end of No. 8 ; and another bookstall behind the buffer stops of platforms Nos. 10 and 11. A distinctive feature of this part of the station is the arcade of columns extending between platforms Nos. 9 and 10, and carrying the roof girders where the older and newer portions of the station join.

The roadway between platforms Nos. 11 and 12 is served on the one side by the thoroughfare, already mentioned, passing alongside the main circulating area, while a separate approach for empty cabs is provided from Hope Street, following a looped path to reach the level of the station itself, joining the other portion near the ends of platforms Nos. 12 and 13. In the angle may be noted the cab office and a store for sleeping car and other requisites. A Post Office mail room, a tobacco stall and stairways connecting with the Low Level station premises below are also located in this part of the station. Other matters calling for attention are the offices near the outer ends of platforms Nos. 9 and 10 providing accommodation for the foreman shunter, who is usually in communication with all parts of the station and the signal cabin and for the locomotive inspector. Usually during the busy period for arriving and departing trains the assistant stationmaster on duty is stationed here, as he has a good view of the whole of the station from this point and is able to communicate at once to any part by telephone. The loading bank at the ends of platforms Nos. 11 and 12 is provided with a 3-ton crane and with hoists connecting with underground premises. It is enclosed by gates so that consignments unloaded to road vehicles cannot leave except under supervision. Adjacent to the loading bank at the end of No. 13 platform accommodation is provided for carriage examiners, locomotive inspectors, &c. Powerful hydraulic buffer stops are provided at the ends of all platforms. Telephone boxes, enabling the staff to communicate with the signal cabin and with various parts of the station are provided on each platform. The numbers of the various platforms are clearly indicated by large suspended numerals.

At the Argyle Street end of the station the eastern entrance includes a curved passageway with booking windows on one side and accommodating confectionery and tobacco stalls. There is also a large clock and a train indicator showing the platforms from which trains for various destinations will depart. The passage is continued to communicate with stairways leading to various platforms, and also with the system of passageways from the Hope Street entrance, by which access is given to various parts of the station premises and to the Low Level station. The main access to the latter is actually adjacent to the Hope Street entrance, where ticket examiners and collectors' gates are provided, but by the system of passageways it can be reached from any part of the main station. There is also a connection from the Hope Street entrance to an auxiliary hall and stairway on the opposite side of Hope Street. An important characteristic of Glasgow Central station is the general use of glazed tiles throughout the complex system of underground passageways and the artistic stone and cabinet work wherever suitable.

Besides the public premises there is a network of departments located below the main station, thus utilising the arches upon which the station as a whole is built. Among these are the cellar and underground premises associated with the hotel, the lamp room, Pullman stores, heating plant, electric light and power station, plant for supplying the electric signalling apparatus with current and with compressed air, and an extensive range of parcels offices. These are served by hoists from platforms Nos. 1, 6, 7, 10, 11 and 13. No. 10 hoist also connects with the Low Level station. There is also a loading bank, used for fish, yeast and various heavy traffic, connected with platforms Nos. 11 and 12 by hoists. Below the parcels office proper are lower arches accommodating the lost luggage store. In addition to supplying steam and hot water heating for station and hotel premises, the boilers have connections with a system of pipes alongside tracks in the station by which standing trains can be heated before the locomotive is attached.

A few traffic statistics concerning Glasgow Central station may now be given. Ordinary arrangements provide for 246 arriving and 235 departing trains. The busiest morning period is between 8 and 10 a.m., when 50 trains arrive, while between 4 and 6 p.m. there are 54 departures. At holiday periods there may be as many as 150 additional trains, while at all times, and particularly adjacent to the holiday seasons ordinary trains have to be strengthened and reliefs frequently run on Saturdays, especially on the Coast services. Of the suburban routes the Cathcart " Circle " is the busiest, there being 13 arrivals between 8.30 and 9.30 a.m., and 15 departures between 5 and 6 p.m. According to the latest statistics available about 65,000 passengers per day are dealt with at Glasgow Central station, a large proportion travelling with zone and season tickets. An important feature of the traffic, especially in regard to the Cathcart " Circle," is the midday traffic of season and zone ticket holders travelling home for the midday meal and returning. About 6,000,000 passengers are booked at the Central station in the course of 12 months. On Saturday nights and before public holidays the station is exceptionally busy, almost every available square foot of the extensive circulating area being occupied by passengers proceeding to or from trains or waiting. On Saturday afternoons numerous additional trains have to be provided to meet the football traffic, while reliefs are occasionally necessary when important matches are arranged in mid-week. On early closing days in towns within a few miles of Glasgow, and on " merchants' holidays," the Central station is also rendered very busy owing to the large numbers of people who come into Glasgow.

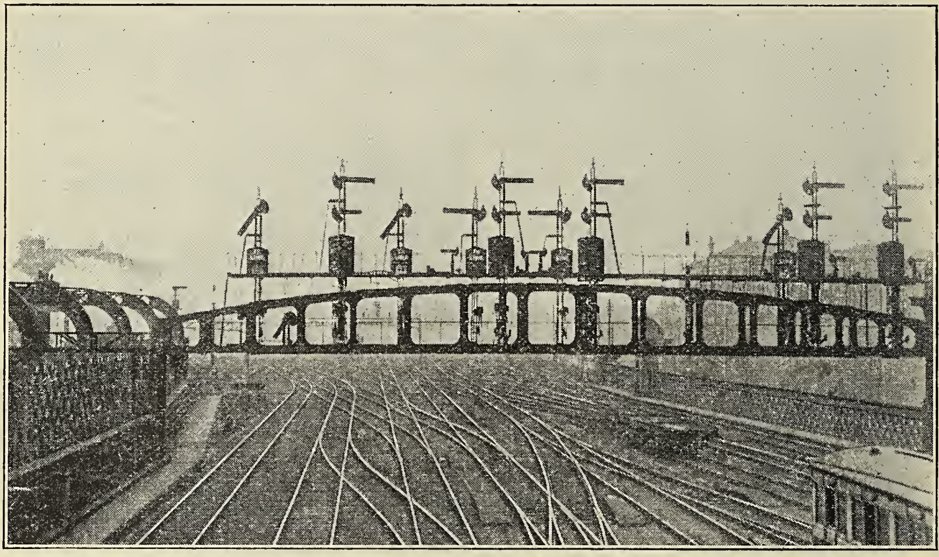


Photo.] [*J. F. Gairns.*

SIGNAL BRIDGE, WITH ROUTE-INDICATING SIGNALS, ON CLYDE BRIDGE,

Photograph taken from the station direction.

Beside the passenger traffic there is a

heavy traffic in parcels and fish from the coast to Glasgow, and thence to other towns and to England, and dead meat for London. It is estimated that during an average period of 12 months nearly 3,000,000 packages are handled, together with over 1,000,000 packages of a miscellaneous character, representing a weight of some 30,000 tons.

Glasgow Central station is, of course, mainly concerned with the traffic of the Glasgow area, and to and from principal towns in the southern counties of Scotland, most of the northern traffic being dealt with at Buchanan Street. There are, however, two or three trains to or from the north which use the Central station, and certain inter-change services are operated for luggage, parcels and other purposes. There is no need to consider the traffic of the Central station in detail, but a few notes in regard to the principal Anglo-Scottish services may be given.

The first important arrival is that of the postal train from London, due at 5.25 a.m. At 6.55 a.m. (Mondays excepted) and at 7.16 a.m. (Mondays only), the first of the London sleeping car trains is due, followed by a train from Liverpool and Manchester at 7.40 a.m. At 9.35 a.m. the 11.40 p.m. sleeping car express from London arrives. At 3.20 p.m. the restaurant car express from Liverpool and Manchester arrives, followed by another one at 6.5 p.m., while at 6.15 p.m. the 10 a.m. restaurant car express from London is due. The through Glasgow portion from London of the 1.30 p.m. ex Euston arrives at 10 p.m., while a Manchester and Liverpool restaurant car express is due at 11 p.m. The most important departing trains are the 10 a.m. London, Birmingham and West of England, the 10.10 a.m. Liverpool and Manchester, the 1.30 p.m. for London, Liverpool and Manchester, the 4.10 p.m. Liverpool and Manchester, the 5.30 p.m. up limited mail for London and West of England, the 6.35 p.m. up postal for London, the 9.30 p.m. sleeping car train for London, the 10.30 p.m. sleeping car train for London, the most important sleeping car express from Scotland to the south, with, on occasion, as many as seven sleeping cars, and the 11.5 p.m. (sleeping car train) for Liverpool and Manchester.

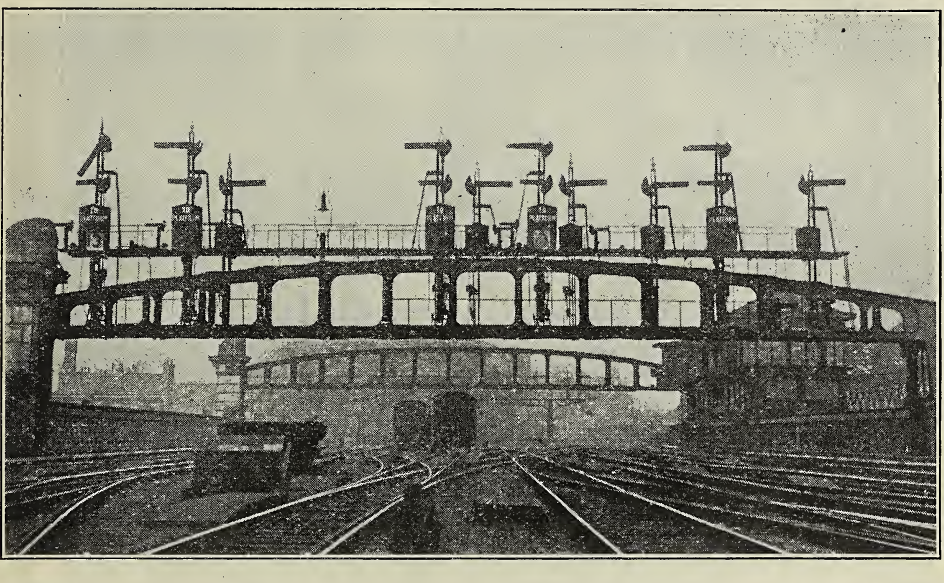
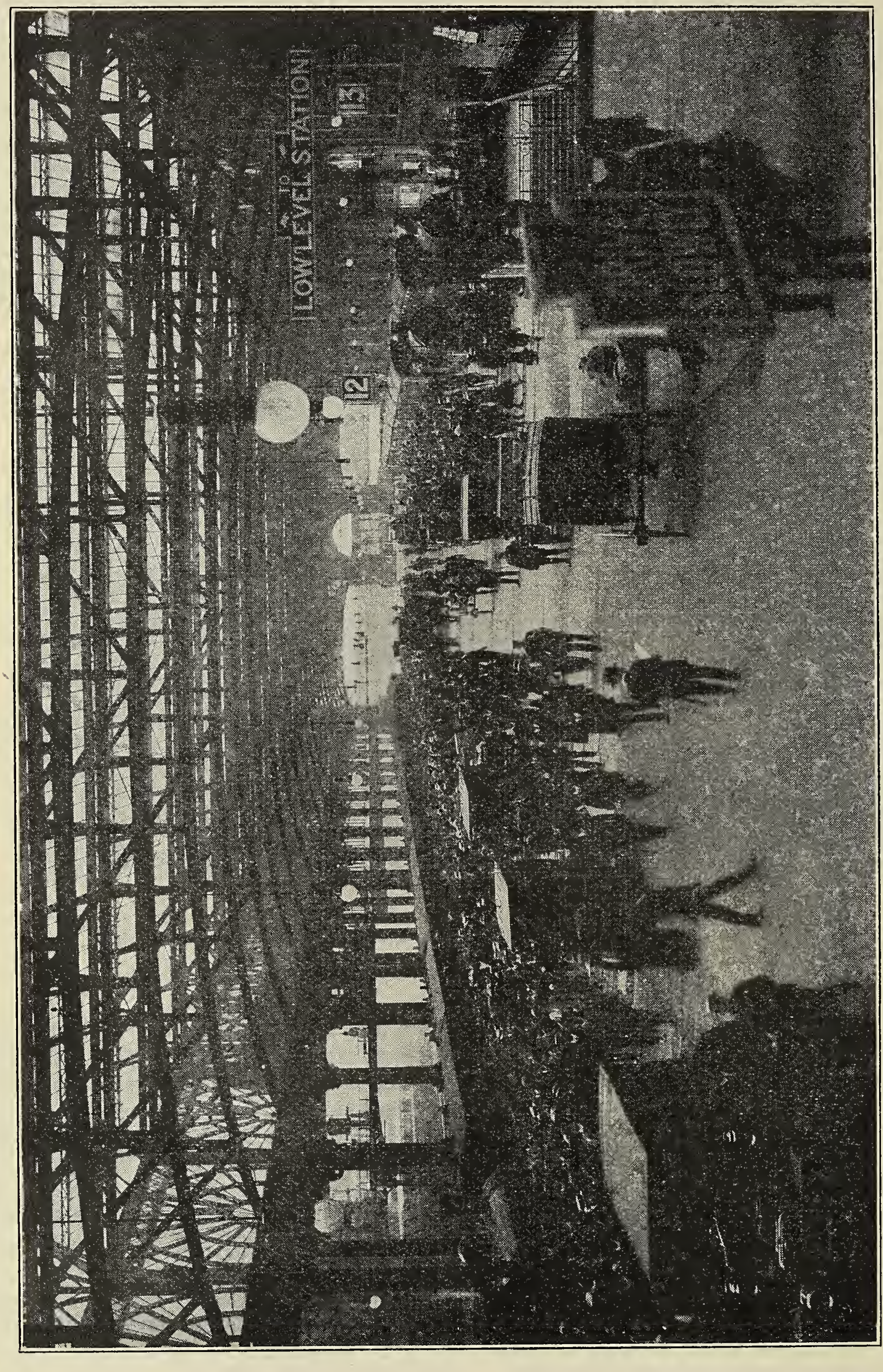


Photo.] [*J. F. Gairns.*

SIGNAL BRIDGE, WITH ROUTE-INDICATING SIGNALS, ON CLYDE BRIDGE.

Looking towards Central Station, showing Signal Cabin.

The traffic staff at Glasgow Central station is under the supervision of Mr. R. Scorgie, stationmaster. He has two assistant stationmasters, Messrs. J. Rankin and T. Creighton. Their staff includes 3 station clerks, 2 yard inspectors, 7 station



GENERAL VIEW IN THE WEST SIDE STATION.

inspectors, 18 signalmen, 7 cabin boys, 1 telephone boy, 4 excess luggage collectors, 25 ticket collectors, 4 station foremen, 8 parcel porters, 41 porters, 1 billposter, 2 searchers, 2 letter sorters, 5 porter guards, 1 underman, 7 waiting room attendants (female), 38 guards, 22 carriage cleaners (female), 9 carriage lampmen, 35 yard foremen and shunters, 16 cloakroom attendants, and 6 police. The parcels department is under Mr. R. Hair, whose staff numbers 134, and the 30 clerks in the booking offices are under the charge of Mr. W. Murray.

A few remarks may now be made in regard to the Central Low Level station. This has two island platforms, there being in each direction a loop between the tunnels at either end, so that while one train is waiting to entrain or detrain passengers (a stop of 2 or 3 min. being usually allowed), a second train in the same direction can be brought into the station, and pass the other if required. As a rule, all trains serving particular routes or destinations use the same side of a platform, so that waiting passengers are automatically divided into two sections, distributed on either side. There are two signal cabins, East and West, and containing, respectively, 14 levers and 15 levers. About 150 trains ordinarily use the Low Level station, but there are, in addition, a number of goods and mineral trains which proceed this way. As a rule, though it is not always practicable, tank or tender locomotives fitted with condensing apparatus work trains on Low Level routes. Although ranking generally as part of the Central station, and having hoist connection directly to the parcels department and to the main-line station above, the Low Level station has its own stationmaster, Mr. A. Shankie, under whom are the ticket collectors, platform staff and signalmen attached to the Low Level station.

The writers of both sections of this article are indebted to Mr. D. A. Matheson, Deputy General Manager for Scotland, Mr. R. Killin, C.B.E., now General Superintendent, Midland Division, and Mr. J. Ballantyne, C.B.E., the present General Superintendent of the Northern Division, London Midland and Scottish Railway, and to Mr. J. Mason, District Superintendent, for much of the information utilised, while they have to acknowledge the material assistance and many courtesies rendered by Mr. Scorgie and the two Assistant Stationmasters, Messrs. Rankin and Creighton.

MR. R. SCORGIE.

Stationmaster, Central Station, Glasgow, London Midland and Scottish Railway.

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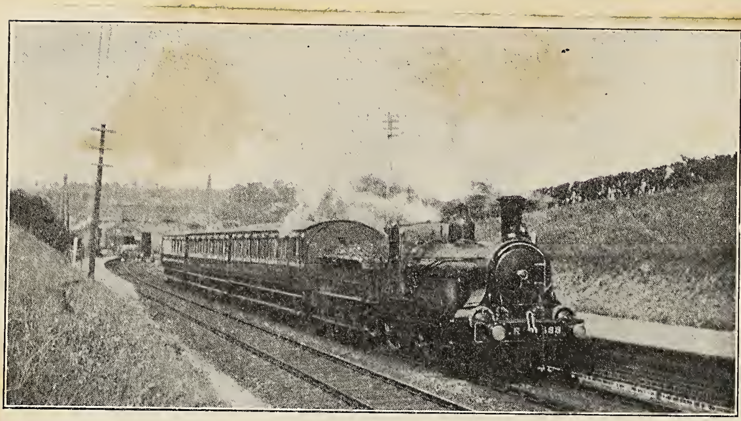


Photo] CALEDONIAN RAILWAY. [*Mr. Tom M. L. Neish.*

Train leaving Invergowrie Station, drawn by 2–4–0 Locomotive No. 1588. (See *Railway and Travel Monthly* for January, 1911, page 47).

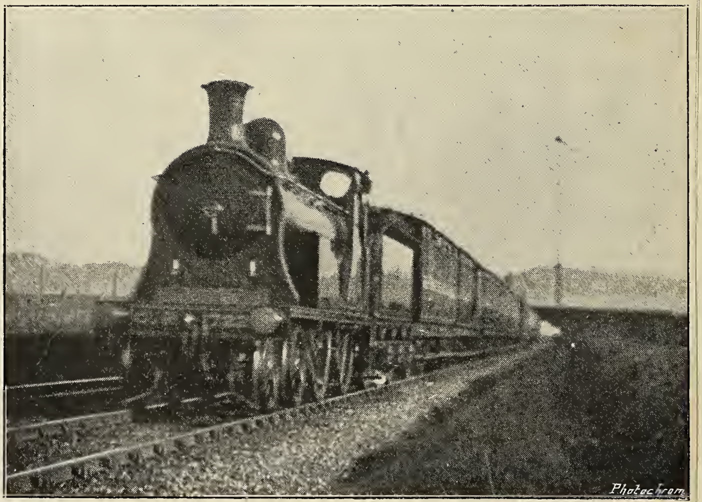
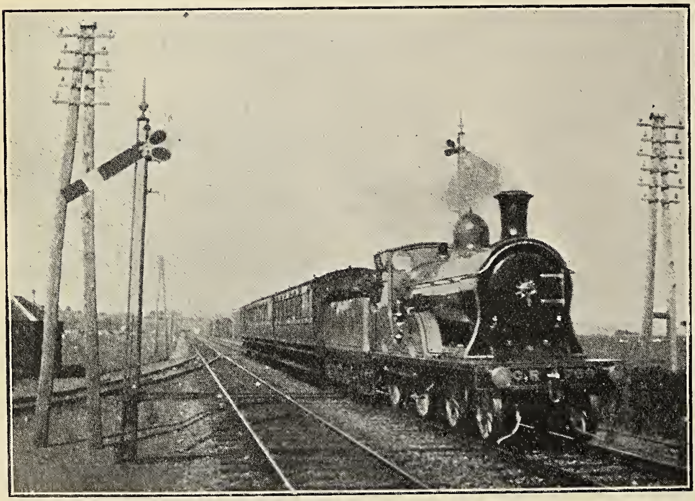


Photo.] [*Mr. J. D. Robertson.*

CALEDONIAN RAILWAY ABERDEEN EXPRESS LEAVING PERTH.



Photo] CALEDONIAN RAILWAY. [*Mr. Tom M. L. Neish.*

Perth-Dundee Train in the Carse of Gowrie, 4–4–0 Locomotive No. 769.

... THE ...
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No. 18] OCTOBER, 1911. [Vol. 3.

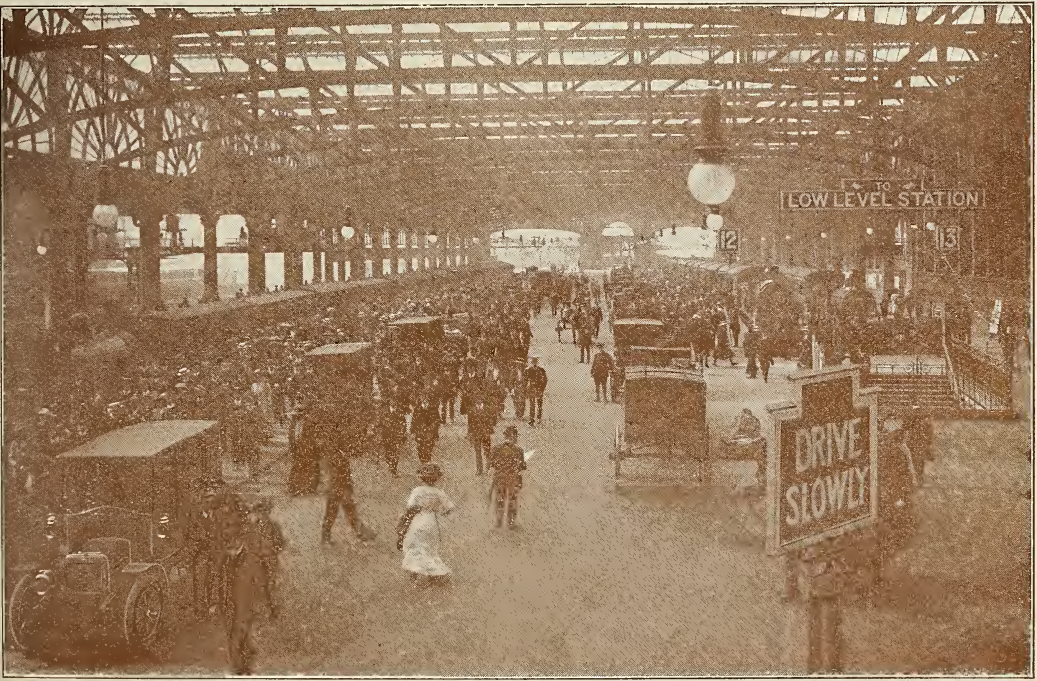
The Romance and Fascination of Railway Stations.

No. 4.—THE CENTRAL STATION, GLASGOW.

By James Scott.

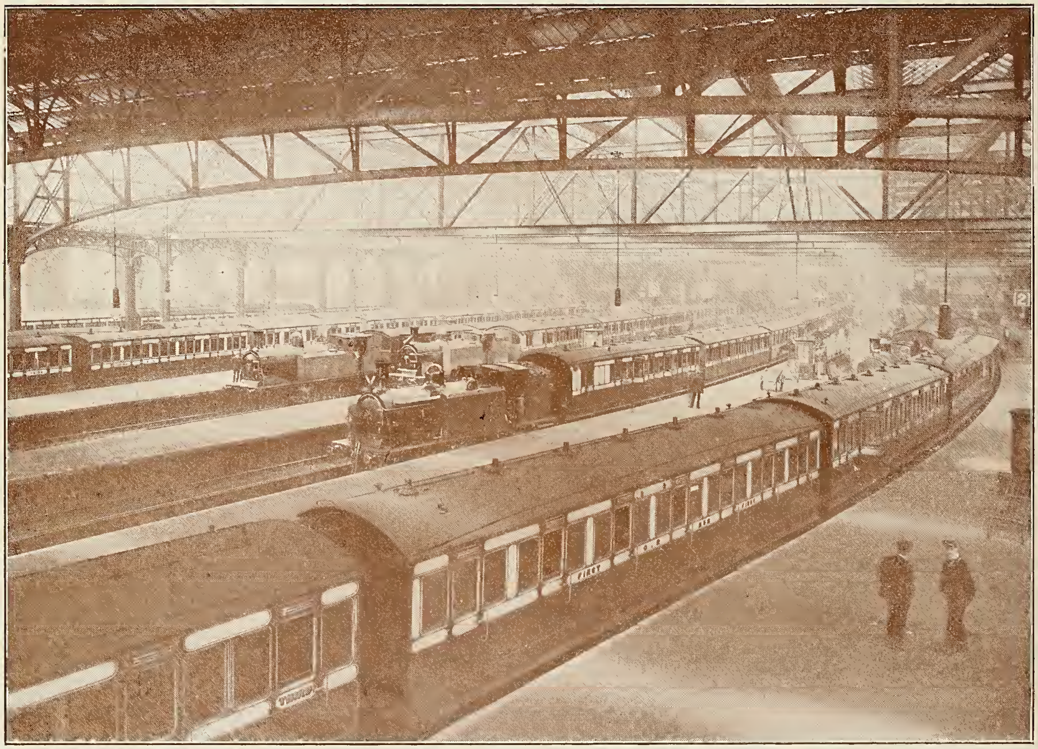
IN Glasgow are the headquarters of the Caledonian Railway Company. This Company's interests have always been closely bound up with those of Glasgow and the West, and although it has rivals within this sphere of influence yet its premier position as regards volume of traffic and popularity in the West is not questioned.

There are two terminal stations in Glasgow of the Caledonian Railway, viz. The 'Central' and Buchanan Street. Passenger traffic at the latter station is principally confined to North traffic, and alongside of the Passenger Station is the Company's largest goods depôt, where the bulk of Glasgow's merchandise is handled. There is no goods traffic at Central Station, which is the principal station of the Caledonian Railway. It is the pulse of the second city of the



ARRIVAL OF MORNING BUSINESS TRAINS AT THE CENTRAL STATION, GLASGOW.

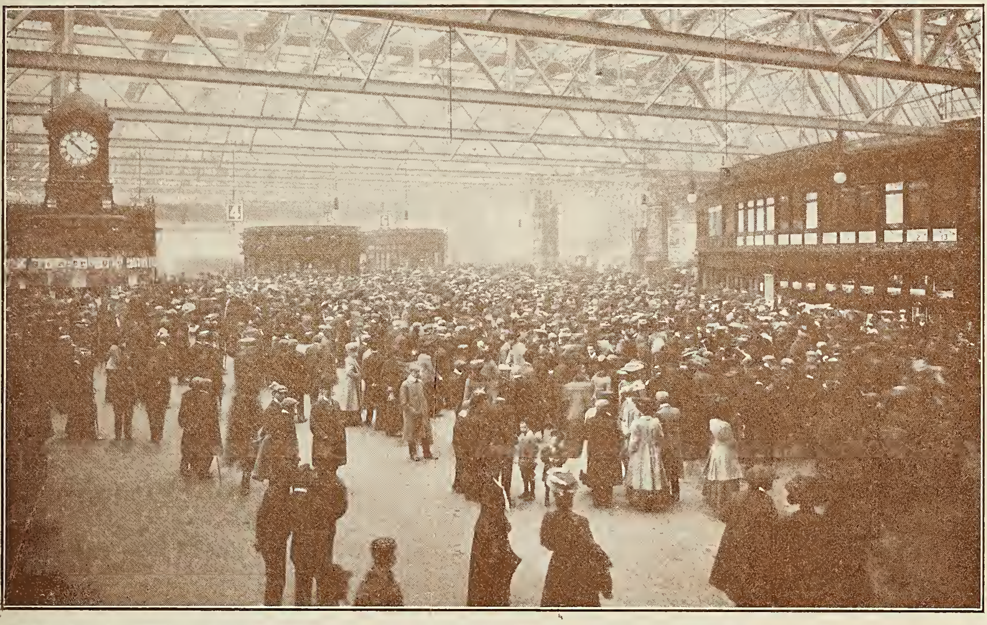
United Kingdom, whose boundless life of industry and commerce throbs ceaselessly through it. The station is truly named "Central," because of the position which it occupies in the City. It stands on a favoured site on the North side of the River Clyde and in the very heart of the Scottish metropolis. It is bounded by Gordon Street, Union Street, Hope Street, and the Clyde, the principal entrance being from Gordon Street. There are other entrances from Union Street and Argyle Street, and there is a special entrance and exit for cab and vehicular traffic in Hope Street. The station spans Argyle Street, one of Glasgow's busiest thoroughfares, and also a small side street called Ann Street, and extends as far southwards as Broomielaw Street and the River Clyde. The most advantageous view of the entire station buildings is that which is obtained from the corner of Bothwell and Hope Streets. The structure embraces the Central Station Hotel, and has at the Gordon Street and Hope Street corner a fine tower which gives dignity and distinction to the whole buildings. In Gordon Street there is a verandah in front of the station with numerous entrances to it, and entering by one of these one comes at once into the large Booking Hall.



GENERAL VIEW OF THE PLATFORMS FROM NO. 2 PLATFORM.

Between the Booking Hall and the commencement of the various platforms or bays there is an extensive esplanade or "concourse," which forms one of the chief features of the station. To the north-west of the concourse is the Train Information Office, and Telegraph Office, and the Hotel entrance with the windows of the Lounge of the Hotel overlooking the platform. To the north-east are grouped the Station Superintendent's Office (which commands a view of the whole station), attractive Tea Rooms, the Left Luggage Office and other offices. On the south side of the concourse are the Book-stall, Fruit-stall, and Tobacco-stall. Under the concourse and stretching right across the whole area are the lavatories with their allied conveniences, bathrooms, hairdressing establishment, etc., access being gained by short staircases from either side of the concourse. In the station there are no fewer than thirteen platforms, and all of them open off the south side of the concourse and are arranged in *échelon* form. They are fenced off from the concourse by iron railings with gates. The concourse runs obliquely to the lines of rails, and is pear shaped. The widest part is opposite the ends of Platforms 2 to 6, and it tapers off towards Platforms 7 to 13, and between Nos. 11 and 12 it merges into the Cab Rank there. Accordingly, when there is a stream of incoming passengers "like flowing water" from the main entrance at Gordon Street, that stream will be gradually diverted by passengers entering platforms Nos. 1, 2, 3 and onwards, until those who have not been drafted off into the nearer platforms reach the platforms furthest away, Nos. 10 to 13.

The feature which impresses one most about the concourse is its spaciousness. It has many other features to commend it, such as its convenience of access, its gentle sloping from the various platform levels towards the levels of the streets, its paving, and the like. But the chief recommendation of the concourse is that here travellers by train are glad to find elbow-room, and that even on busy days. It may be crowded to overflowing and yet such is its "elasticity" and capacity of decentralization that crowds mingle and dissolve in the most easy manner. Absolute congestion of traffic, such as is not unknown in certain places, is here almost impossible. The concourse is exceptionally broad (it is about 3,000 square yards in area) and the roof is high; and accordingly there is no cramped feeling. One gets "room to think" and to breathe, to take one's bearings even amidst hosts of people, to keep one's friends in sight, and to reach one's train. Crowds may congregate within sight of the Train Indicator, but without blocking or confusion.



A TYPICAL 'GENERAL HOLIDAY' CROWD INSPECTING THE 'TRAIN INFORMATION BOARD' AT THE CENTRAL STATION.

The Train Information Board deserves some special notice. It occupies a space of 74 feet in length on the north-west side of the station. Within sight of the Indicator there need be no rushing after porters or officials in order to find out particulars about trains. Passengers need only be able to see and read and act upon what their senses convey to them. The Board shows with unmistakeable clearness and simplicity arriving trains on the one hand and departing trains on the other, but of course about four-fifths of the space is devoted to the latter. The departure space is divided into thirteen divisions, one for each platform, the number of the platform they represent appearing on the bottom of each in consecutive order. The first line on each departure division indicates the hours at which the trains will leave that platform, *i.e.* during any particular hour of the day, and the second line of space on the Board indicates the places to which the trains are going. The notices regarding them are, of course, continually being changed by the official in charge. Although a careless observer might imagine that his task resembles that of the billiard-marker, or the scorer at a rifle range, as he hoists board after board for the information of the waiting public, yet his work is exacting and important in the regulation of the station traffic. He is in constant telephonic communication with the inspectors and signalmen at the other end of the station. They speak, as it were, through him. A mistake, even in regard to the number of the platform from which a certain popular train was to start on a busy day, might mean disorganization of traffic and delay, and a stampede of the passengers to the wrong departure point with its attendant annoyance. That such mistakes do not happen is due to the care and accuracy of the official in charge of the Train Information Board.

EXTERIOR OF THE CENTRAL STATION, GLASGOW.

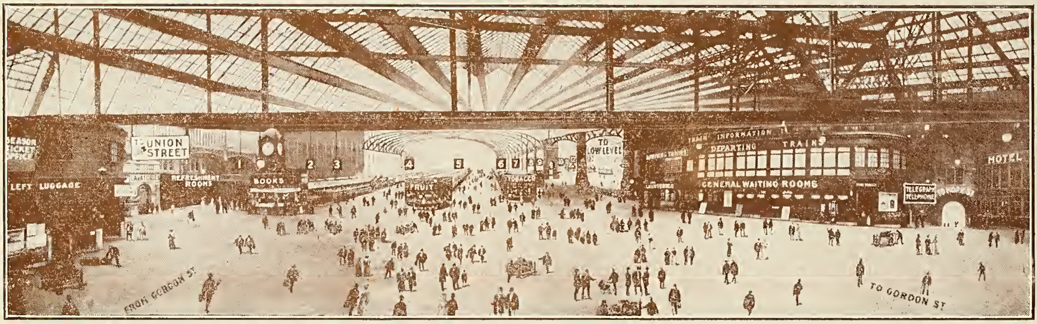
A separate column on the Board is set apart for "Special Announcements" such as this:—

"NEW EXPRESS SERVICE TO THE ISLE OF MAN, *via* FLEETWOOD."

An intending passenger may hurry into the station and as he crosses the concourse he glances at the Train Information Board without stopping or the loss of a moment's time. Having identified the starting-time of the train to the town to which he is to travel, he need ask no questions but proceed at once to the platform whose number is stated on the Board, in confidence that he will find the train in readiness at the appointed hour. The lettering and the numbers are given in large type, so that there is no difficulty in deciphering them at a considerable distance. Beneath the Information Board, at a lower level, are Tables giving information as to how arriving trains have been keeping their schedule time at various points in their journeys, and as to the state of the weather at the many seaside and other resorts to which the Caledonian Railway has connections. Contrast with the improved method of giving train information just described, the antiquated boards in miniature size and placed a few feet from the ground round which crowds jostle and crush in their efforts to discover the information about trains which they want. These boards resemble nothing so much as those in use on the walls of many churches in Scotland bearing the numbers of the psalms and hymn tunes to be sung at service! Only those who are immediately in front of such a board in a station can see it properly, but they see it at the expense of those behind. Everyone blocks the view of everyone else, and after much craning and straining most people are compelled to abandon the attempt to read the board and go in search of a porter. As has been shown, it is otherwise at the Central Station.

CAB RANK, SHOWING PLATFORMS NOS. 10, 11, AND 12.

Although the station is one immense whole, it has historically two parts, the Old and the New. The explanation of this is that owing to expansion of traffic the station was very considerably extended and re-organized in the year 1906, the date when the work—extending over a period of five years—was completed. Those who are interested in the engineering and technical problems which arose in connection with the re-construction of the station will find that they were exhaustively dealt with by Mr. Donald A. Matheson (then Chief Engineer and now General Manager of the Caledonian Railway) in a scholarly paper read before the Institution of Civil Engineers in April, 1910, and reported in Vol. 182 of the Minutes of Proceedings of the Institution, 1909-10. The Old part of the station embraces Platforms Nos. 1 to 8; and the New part embraces those from Nos. 9 to 13. To the discerning eye the division between the Old and the New parts of the station is apparent from an avenue of steel pillars which traverses the station lengthwise between Platforms Nos. 9 and 10. This marks the position of the former west retaining wall of the station. Upon the western row of pillars in the avenue and, as they verily seem, growing out of them, are the girders of the new station roof, while upon the eastern row of pillars rest the ends of the girders of the roof of the old part. The girders of the Old part of the station are straight, while those of the New part are semi-elliptical in form, and the result is that an impression is given by the latter that the roof of the New station is somewhat higher than it really is. Nor are there in the roof of the New part of the station so many cross ties and girders as there are in the Old. The avenue of pillars referred to, which has been facetiously called "Glasgow's Avenue," has some real aesthetic and architectural features, as well as utilitarian advantages for handling traffic on the platforms on either side of it. There are outlets from each of the platforms, excepting Nos. 1 and 2 giving access from the High-level Station down to the Subway leading to the Low-level Station and out to Argyle Street.



GENERAL VIEW OF THE CIRCULATING AREA, SHOWING DIAGONAL ARRANGEMENT OF PLATFORMS.

As regards the size of the station, it will give some idea to state, that the longest platform (No. 9) is 965 feet (or about 322 yards) in length, three of the platforms being 900 feet or over (viz. Nos. 2, 9 and 10). The length of all the platforms added together is 8,796 feet, or fully a mile-and-a-half, and this figure divided by the length of a railway coach indicates the number of carriages which can be accommodated within the station lines at their maximum content. The two shortest platforms are Nos. 6 and 7, which are 435 and 430 feet in length respectively.

The new part of the station extends Southwards a distance of 100 yards beyond the line of the old station and terminates in a kind of *Arc de Triomphe*, adjoining which is the platform reserved for traffic in milk, fruit and fish, for horse boxes, and for carriage trucks. This outlying part of the station is really situated over what is known as the Broomielaw span of the Glasgow Railway Bridge, and at this point, almost before one knows it, one is standing directly over the river Clyde. This special platform lies between the lines of Nos. 11 and 12, and has lines of its own which abut on them. Here in the early hours of the morning trains arrive with their supplies of food for the citizens of Scotland's metropolis, and lorries and vans, getting access by the cab rank, are

INTERIOR OF SMOKING ROOM AT THE CENTRAL STATION.

enabled to come alongside the trains for loading purposes. This short platform is one of the most useful and important; for here also Post Office mail trains, and special consignments of all kinds are dealt with. There is a crane on the platform for use when required, and there are hoists from the platform to Broomielaw Street below.

To those who know how frequently it rains in Glasgow, the roofing of the station will appear by no means the least important! The roof of the entire station is covered in with "Patent" glass, lightly stained, which admits abundance of light to the station and relieves it of any appearance of gloom. The new part of the station is, if anything, brighter than the old part, owing principally to the nature of its construction. An apt criticism has sometimes been made regarding glass-covered stations, that they resemble nothing more nearly than "a conglomeration of hothouses." No doubt, particularly to those who live in the high buildings overlooking the station, or to passing air-men, the resemblance mentioned must be apparent. If a new city were being planned upon unoccupied ground and in it a Central Station was to be erected, it is possible that the architectural form of that station might be different from the Central Station as we know it, and "hothouse"-like glass roofs might be obviated. But existing conditions must always rule; and those who planned the roofs in Central Station have with practical good sense made them so that they admit an abundance of light and are durable while at the same time of not unpleasing appearance.

The dead end of each platform is guarded by sets of hydraulic buffer-stops. The buffers, which resemble huge piston rods, work in cylinders and have a 7-foot stroke. The cylinder is kept constantly full of water, and on the pressure applied by the buffer being driven in, the water is expelled through small apertures beneath the cylinders. The result is that the buffers give a cushioning effect on any impact. These buffers were originally tested by a momentum consisting of an engine with vehicles (amounting in all to 400 tons weight) striking the buffers at a speed of about 10 miles an hour! The buffers are tested regularly every week by the impact of an engine.

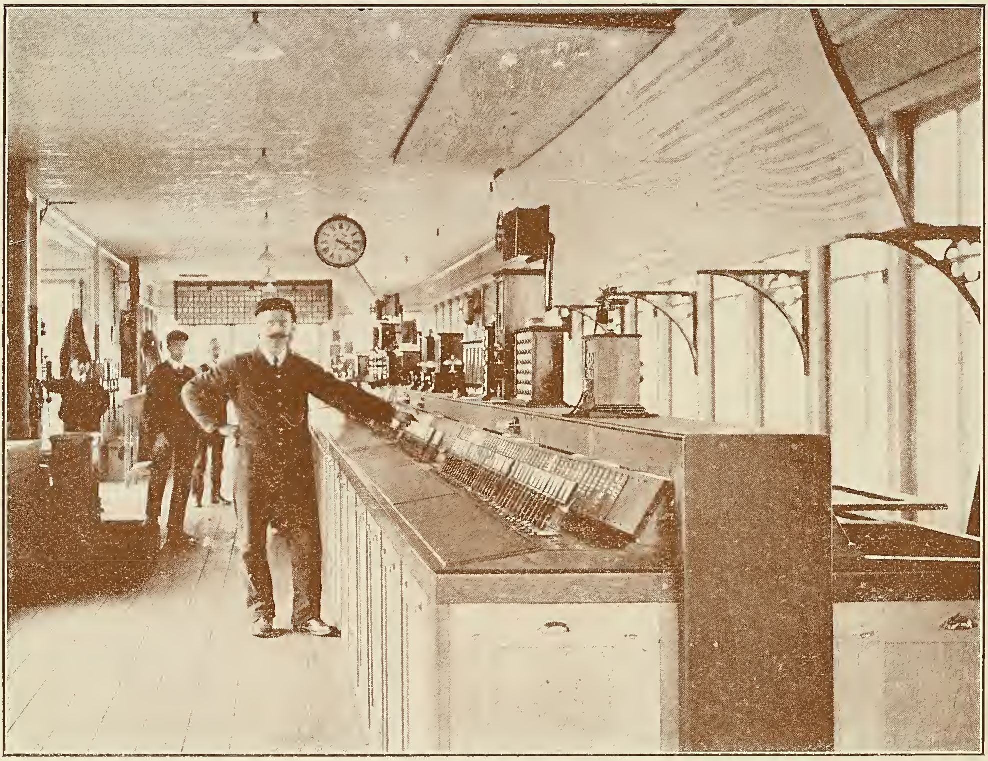
VIEW OF THE COSY TEA ROOM AT THE CENTRAL STATION.

Certain statistics with regard to the traffic at Central Station are eloquent of its importance and popularity. The total number of passengers dealt with at the station were :—

For the year	1908	17,015,880
„	1909	17,171,280
„	1910	18,089,720

This shows that the traffic has steadily increased, and that fully a million passengers more used the station in 1910 than in 1908. This increase is wholly in the number of passengers holding season or trader's tickets, which in 1910 reached the figure of 8,145,640. It appears that in the three years 1908 to 1910 the numbers of passengers booked (*a*) from the Central, (*b*) to the Central, and (*c*) through the Central, have varied comparatively little.

Rather more trains arrive at Central Station than leave it. In the holiday month of August, 1911, the total number of arriving and departing trains daily was no less than 515. On Saturdays there were some 20 additional. Comparing the figures for a winter month, viz. January, 1911, it is found that some 52 fewer trains arrived and departed. There is a certain amount of Sunday traffic which does not vary, totalling at 28 trains arriving and departing. The figures given are for passenger trains only, empty carriage trains and the like are not included.



INTERIOR OF ELECTRO PNEUMATIC SIGNALLING BOX (CARRIED OUT BY MACKENZIE & HOLLAND AND WESTINGHOUSE BRAKE COMPANIES), WHICH CONTROLS TRAINS ENTERING AND LEAVING THE CENTRAL STATION.

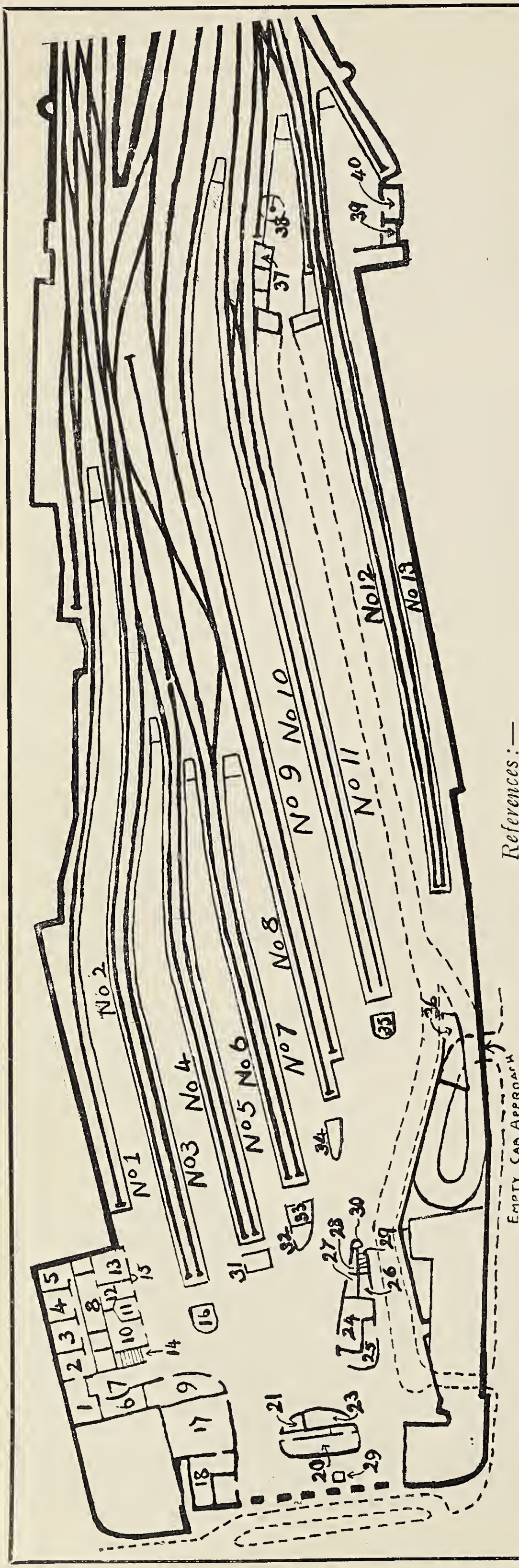
It is of interest to notice how the traffic at the station is dealt with. All the platforms are used as arrival or departure platforms as occasion requires. At the Platforms Nos. 1 and 2, main line, south trains (that is, to London and all parts of England) take their departure, and they arrive at Platforms Nos. 11 and 12 in order to be near the long cab rank which is situated between these platforms. The advantage of this arrangement is apparent, as passengers from the South, with their luggage, have merely to step across the platform to their cabs, carriages, or motors. At Nos. 3 and 4, trains connecting Edinburgh and other towns to the East arrive and depart. At Nos. 5 and 6, those connecting Hamilton, East Kilbride and Kilmarnock are worked; and at Nos. 7 and 8 those of the Cathcart Outer and Inner Circle, which are of the nature of a suburban service. It is thus seen that for the sake of convenience of access the suburban and local traffic has been kept to the short platforms situated about the middle of the station. At Nos. 9 and 10, Ardrossan and Lanarkshire trains are dealt with; at No. 11, Wemyss Bay trains; and at Nos. 12 and 13, trains connecting Gourock and Greenock and other towns in that neighbourhood. As a matter of fact, except for the arrival of London and English trains, the Platforms Nos. 11 and 12 are reserved for the immense traffic between Glasgow and the West Coast of Scotland and all parts of the Clyde. There is published each month a Schedule of Platform Arrangements for trains arriving at and departing from the station. The schedule consists of fifteen pages of closely-printed matter, indicating with great detail the trains and platforms and times of arrival and departure. The arrangements are made with a view to minimising the crossing of trains on the approach lines, and strict adherence is given to the schedule for the docking of trains in the respective platforms.

The busiest hours of the day at the station are from 8 to 10 in the forenoon, and from 4 to 6.30 in the evening. One o'clock is also a very busy hour with the Cathcart Outer and Inner Circle trains. Competition with the tramways has spurred the Caledonian Railway on to give a very efficient service of trains at this hour, when thousands of Glasgow's business employees wish to go to the suburbs for lunch and return within an hour's time. One train after another is rapidly filled and dispatched within a very few minutes of each other, and by this quick dispatch of traffic the railway has been able to hold its own satisfactorily with the competition of the tramways.

The busiest time of the year is when the Glasgow Fair Holidays occur, which is usually in the third week of July. At that time the whole of the station is thronged with holiday-makers going to all parts of Britain. Other busy times of the year are, of course, at the end and commencement of each month, and also at the Spring and Autumn holidays. As the process of purification of the Clyde in recent years has proceeded, the railway company has had to compete with Clyde steamer traffic at Broomielaw, but the Company is holding its own in regard to this also.

The newest feature of the Caledonian Railway's enterprise is the starting of what are known as "Long distance residential train services" from places at the coast or inland health resorts in Lanarkshire, Peebles-shire and Dumfries-shire. By these services business men are able in summer to live with their families in the pleasant holiday districts at considerable distances from the city and yet attend daily at business.

The whole working of the Station Traffic is under the direction and control of one immense signal cabin two storeys high, situated on the centre of the railway bridge which spans the Clyde. There is a small cabin within the station precincts between Nos. 9 and 10 platforms called "Crow's Nest," but its functions are purely local, and do not derogate from the sweeping importance of the Cabin on the bridge. As has been indicated, the end of the station abuts on the end of the bridge, and the signal cabin stands on a framework spanning the space between the old and the new bridges over the Clyde. It thus is situated between the lines of rails which issue from the old station and those which issue from the new station. From the cabin to the one side of the new bridge is an overhead footbridge—*i.e.* at the level of the floor of the cabin—which enables the signalmen going to and from their work to cross



References:—

1-5. Offices.
6. Booking Office.
7. Booking Hall.
8. Ladies' Lavatories.
9. Tea Room.
10. Refreshment Room.
11. Gentlemen's 1st Class Waiting Room.
12. Ladies' 3rd Class Waiting Room.
13. Ladies' 1st Class Waiting Room.
14. Stair to Low Level Lavatories.
15. Drinking Fountain.
16. Bookstall.
17. Cloak Room.
18. Lost Property Office.
19. Excess Luggage Office.
20. Booking Office.
21. Enquiry „
22. Lavatory.
23. Shop Parcels Office.
24. General Waiting Room.
25. Telegraph Office.
26. Writing Room.
27. Train Enquiry Office.
28. Inspector.
29. Stair to Low Level Lavatory.
30. Drinking Fountain.
31. Fruit Stall.
32. Tobacconist's Stall.
33. Platform Inspectors.
34. Ladies' Waiting Room.
35. Bookstall
36. Cab Order Office.
37. Telegraph Office.
38. Three-ton Crane.
39. Carriage Examiners.
40. Locomotive Inspectors.

SKETCH PLAN OF GLASGOW CENTRAL STATION.

the rails at this busy point without incurring personal danger. They cross the footbridge and descend from it at the other end by a spiral stair within the upper part of one of the pilasters of the bridge. The interior of the signal cabin is itself wonderful. It is about 106 feet long, and has an interlocking frame 82 feet in length. On entering one is not greeted with the loud banging and clanging noises which are inseparable from signal cabins in which the manual lever system is in use. This cabin uses the electrical pneumatic McKenzie-Holland and Westinghouse Power Signal Co., Ltd.'s system. With regard to it, let Mr. Matheson speak: "The points and signals are moved by motors operated by compressed air, and the motors in their turn have their valves actuated by electro-magnets controlled from the interlocking apparatus in the signal-box. . . . With the electric control and the high pressure air the action of the point motors is very quick, and the return electric indication in the signal-box being almost instantaneous, the system can claim the merit of speed."

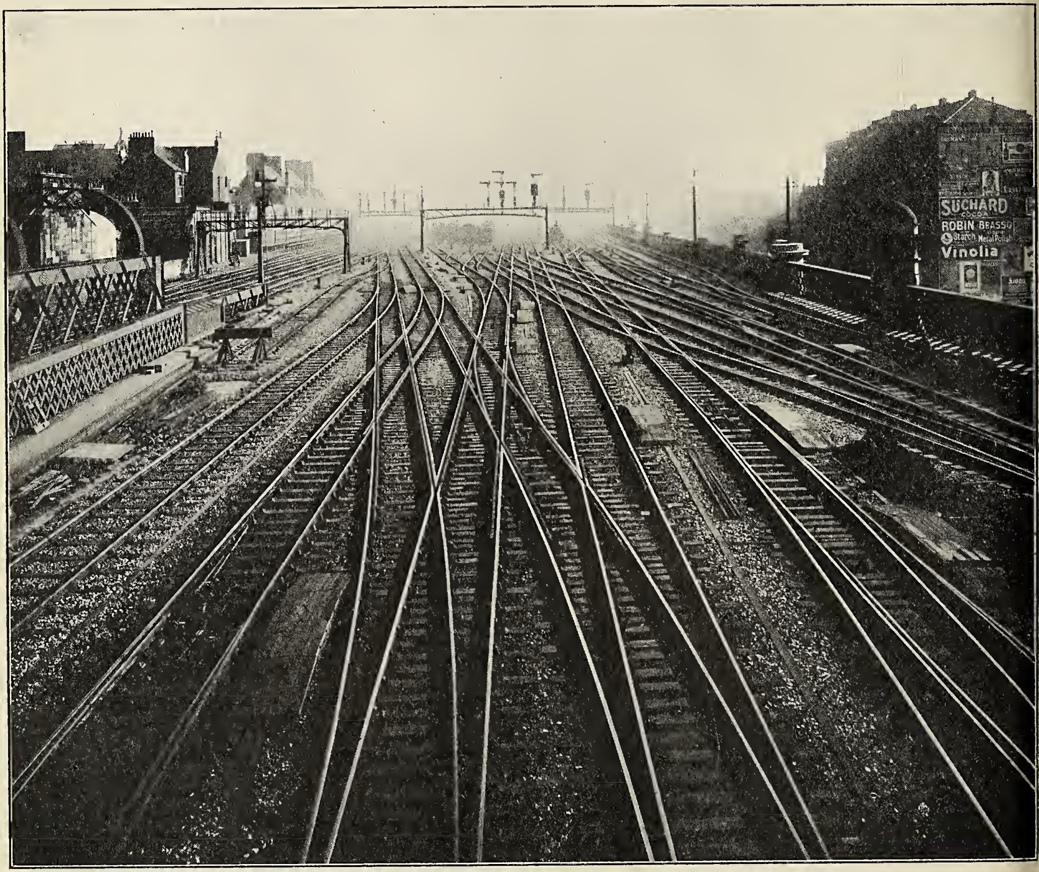
It is not to be wondered at that the Central Station manipulation of traffic required special treatment. There is a long row of short levers which on being pulled lightly respond at once to the touch, with no more than a few clicks of sound in giving or releasing the contact. There are no fewer than 371 levers, which are usually worked by three men. They have the assistance of two boys, one of whom registers the times of arrival and departure of trains in the Cabin Journal, and the other attends to the numerous telephones. Here, although time is measured almost in seconds, and every half minute is of the utmost value, there is little noise and there is no confusion. There is ringing of frequent bells, the tapping of signals, and messages coming through the telephones, but apart from these sounds and the throbbing of trains which pass and re-pass continually outside the cabin on either side of it, there is an absence of the factory-like noise which is so well known within other signal cabins. In fact one finds it hard to believe that so momentous operations are being performed outside the cabin, whilst within it, all is so smooth working and seemingly so automatic. It is true that everything goes like clock-work; but only keenly alive minds and undiverted attention on the part of the men in charge could ensure such perfect traffic working as is exhibited in this signal cabin. The men have to do a good deal of moving up and down the interlocking frame, and although they have only an eight hours' day, the constant strain of the work even for that length of time must be wearing. There is of course a full equipment of indicators, block instruments, miniature signals, charts of the lines, miniature electric lights connecting with the signal-lights, and a double clock with Greenwich time above the signalmen's heads. Most interesting are the two large indicators, at either end of the cabin, the one controlled from the signal cabin at Bridge Street Station (some 300 yards distant, where the many auxiliary siding lines of the Central Station are situated) and the other from the Inspectors' boxes which are placed near the south ends of the Central Station platforms. As trains are signalled to arrive or depart, these indicators flash into view the numbers of the platforms which the trains are to enter or leave. If by any mischance a luggage barrow were to fall from any of the platforms upon the line, the attention of the men in the signal cabin can be at once attracted by any of the Inspectors using an electrical apparatus making a horn sound loudly in the cabin, and this warning would enable an accident to be averted. The signals are placed on overhead galleries or gantries, and beneath the signal-arms the appropriate numbers are shown, for the information of engine-drivers and others, of the platforms to which the lowering or raising of the signals applies. At night these numbers are shown in bright electric light. Electric light is used also in all the signals, and by the movement of a single lever in the cabin the whole of the signal lights are switched on or off. What a far cry this seems from the signal lighting at, say, any of the wayside stations in the country! There, the pointsman choosing the least busy hour in the afternoon prepares his half-dozen signal oil-lamps and goes his rounds with them.

One might speak of the numerous other equipments of this station, such as the many telephone boxes at different places, the clocks at all points where any one might require to know the time, the advertisements artistically arranged in the panels of the walls, the ample and well-arranged notice-boards, posters, and time-tables.

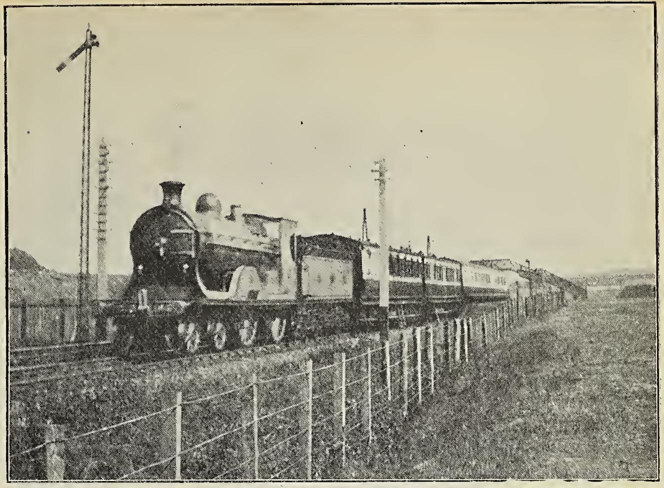
One of the busiest departments of the Central Station is its Parcel Office, which is situated underneath the station at the level of Hope Street and Union Street. There are two entrances from these streets, the principal one being from

Hope Street, and access to the platforms above is provided by hoists which are situated at various points within the Parcels Office and the long passage leading from it. In this way the parcels traffic is enabled to be passed up and down directly to and from the trains, without traversing the platforms for any distance, or interfering with the passenger traffic to any extent.

Beneath the station which has been described in the foregoing pages, there is the Low Level Central Station on the underground railway of the Caledonian Railway, which was opened for traffic in August, 1896. The principal entrance to it is at the corner of Hope Street and Argyle Street, and its platforms are reached by broad subways. The lines of the low level station lie transversely, and almost at right angles to those of the high level station. The low level station accordingly runs in the line of Argyle Street, which at this part of it has a railway station both above and below it! The engineering feat by which this has been planned and accomplished commands the admiration of all, and the more that is learned of the difficulties which were overcome in past years in the evolution of the Glasgow Central stations as they stand to-day, the more astonishing become the daring and the indefatigable toil of those who were responsible for the designing and carrying out of the whole of the works in connection with the extension of the station.

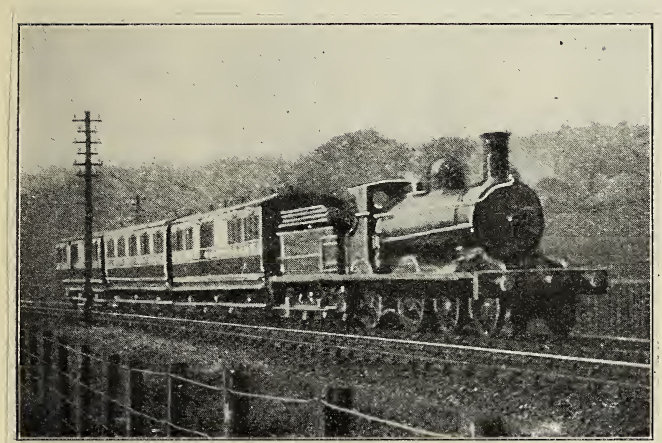


THE RAILWAY FROM SOUTH END OF CLYDE BRIDGE, CENTRAL STATION.



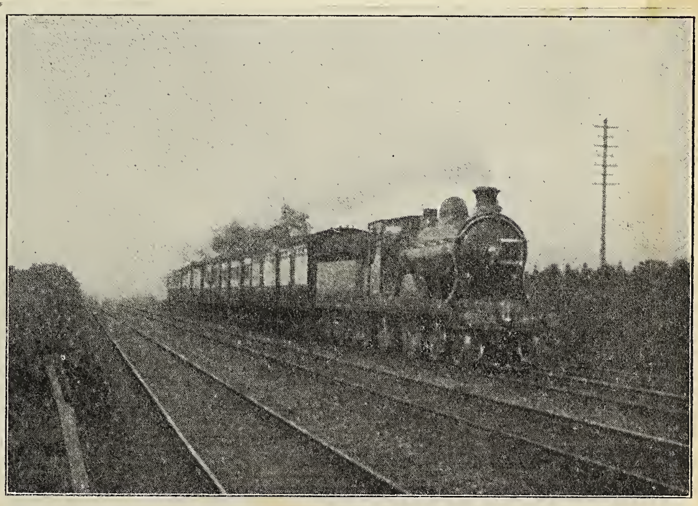
Photo] CALEDONIAN RAILWAY. [*Mr. Tom M. L. Neish.*

Dundee Express passing Magdalen Green Station, drawn by 4-4-0 Engine No. 149.



Photo] CALEDONIAN RAILWAY. [*Mr. Tom M. L. Neish.*

Alyth-Dundee train passing Magdalen Green.



Photo] CALEDONIAN RAILWAY. [*Mr. Fred A. Neish.*

3.40 p.m. Postal Train Aberdeen to Glasgow near Alyth Junction. Locomotive No. 127. This train is run for mail purposes, accommodation for passengers not being guaranteed.

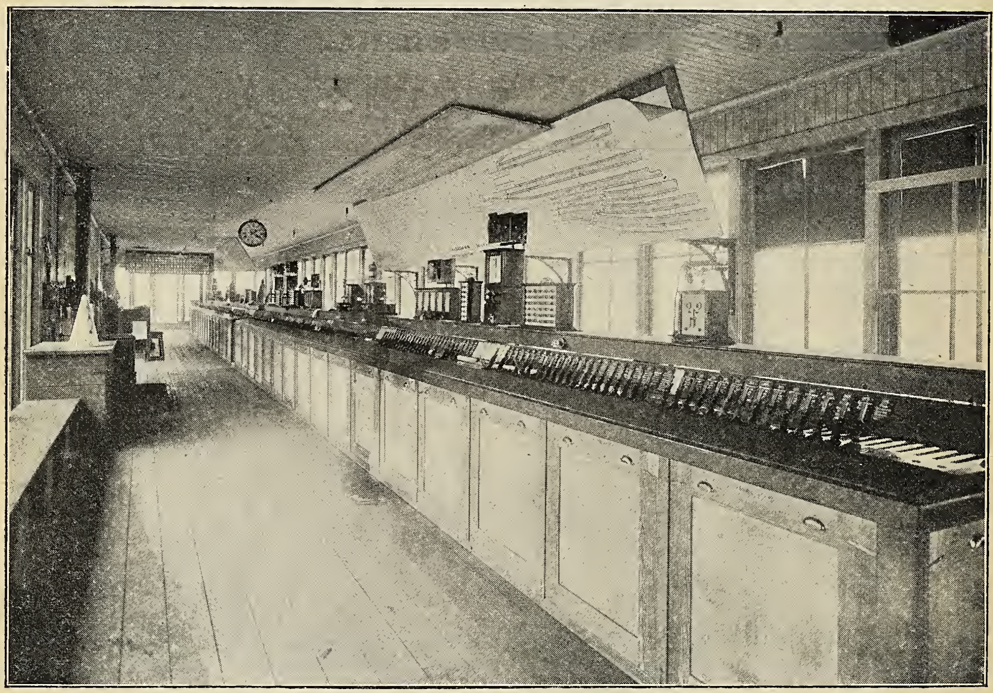
How Trains are Controlled.

THE ELECTRO-PNEUMATIC SIGNALLING INSTALLATION AT CENTRAL STATION, GLASGOW.

By E. Boyd Hutchinson (*Caledonian Railway.*)

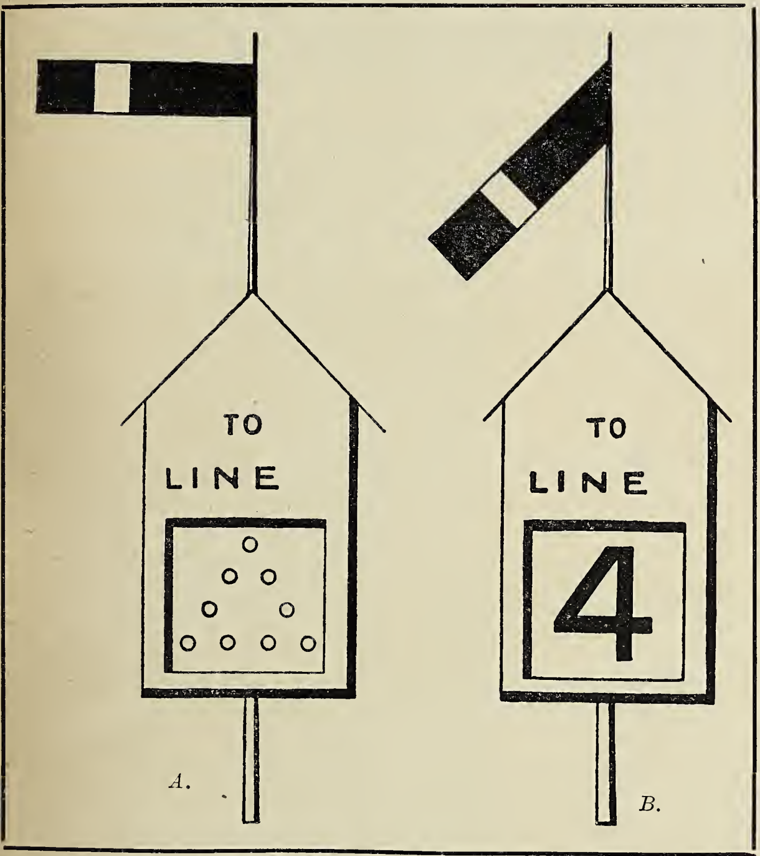
ON Sunday, May 3rd, 1908, the new installation of electro-pneumatic signalling at Central station, Glasgow, Caledonian Railway, was put into operation. Although it is the first of its kind in Scotland, it is by no means the first power signalling installed by the Caledonian Railway, for that railway was among the pioneers in this field. So long ago as 1896 the signal box at Stobcross was fitted with hydraulic power apparatus. This system did not prove very satisfactory, however, and was too costly to be brought into general use.

The extensions and alterations of the last five years have made the Central station, Glasgow, one of the largest and finest in the kingdom (see Railway Magazine for January, 1907). In spite of this, however, one signal box is now taking the place of the three which were previously necessary to work the station. The new box is placed some little way outside the station between the old and the new bridges over the Clyde in the most commanding position available, and represents in every way the latest practice in signalling. It contains spaces for 374 miniature levers, 5 inches long, which at present are divided as follows: 330 working, 8 spare, and 36 spaces. Both signals and points are worked by pneumatic power, the air being at a pressure of from 60 to 80 lbs. per sq. in.



INTERIOR OF THE NEW SIGNAL BOX, SHOWING THE ELECTRO-PNEUMATIC FRAME.

When a lever is pulled it makes an electric contact, which, in its turn, allows the compressed air to work the required signal or points. In the case of a signal being returned to danger, and in the case of movements of points in either direction, the miniature lever can only be pulled half way over at first, making the electrical contact which operates the air motor situated at the signal or points. When the necessary operation has been performed, a second or two later, a slight clicking noise can be heard under the lever in the signal box, telling the signalman that the movement has been correctly carried out and that the electric lock has been taken off, allowing him to pull the lever over fully. In the events of points not coming thoroughly "home," or a signal not giving an absolutely certain indication, the signalman will be unable to pull the lever more than half over, and will have to take steps to see that all is right. The only case in which a return indication is not given to the box is when a signal is pulled off, and in that case the indication is not necessary, as the normal position is at danger. Should the signal not duly respond, of course no harm is done, and the signalman will very soon ascertain that something is wrong by the train being held up.



THE NEW INDICATORS BENEATH THE SEMAPHORES.

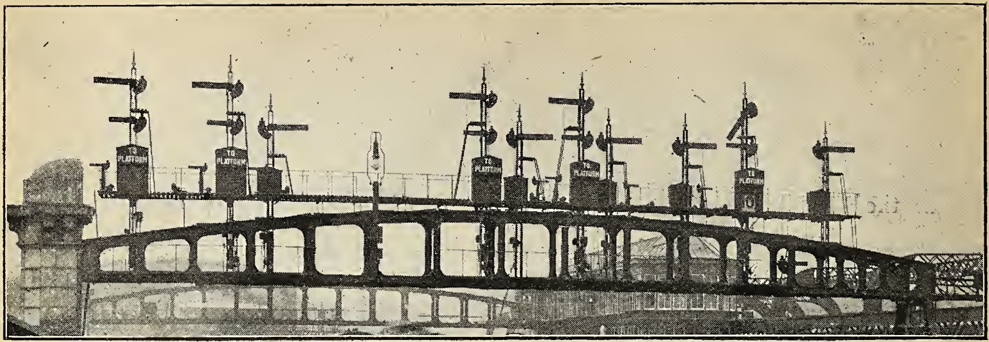
A. At night a red light is shown at the side of the arm to indicate 'Danger,' and the triangle below is illuminated.

B. At night the usual green light is shown when the signal is off and the number below the semaphore is illuminated.

The words, "To Platform," are used on some indicators, in place of the words "To Line" seen in the illustration.

Behind the frame, in an elevated position, is a shelf, on which numerous electrical instruments are placed—block indicators, route indicators, dock clear "or empty indicators" and others; in fact, it is here that the brains of the box are situated. Along the shelf, too, just over certain levers, are placed small electric glow lamps. These "repeat" such signal lights as are not visible from the box. When the signal lamps are lighted, these glow; but should the lamps be extinguished the "repeat" lamps also go out.

There is an excellent and novel arrangement for warning the signalman when a train is ready to leave the station, and informing him of the necessary particulars regarding it. At the station end of the box, suspended from the roof, so as not to interfere with the men's view, is a large oblong box, 9 ft. long by 2 ft. 9 in. deep. The side facing the signalman is made of ground glass, and divided into so many squares to correspond with the platforms in the station. When a train is nearly ready to depart, the platform inspector notifies the signalman by pressing a button. This causes a bell to ring in the signal box, and, at the same time, the square on the diagram representing the platform in which the train is standing becomes illuminated, showing in bright letters which train



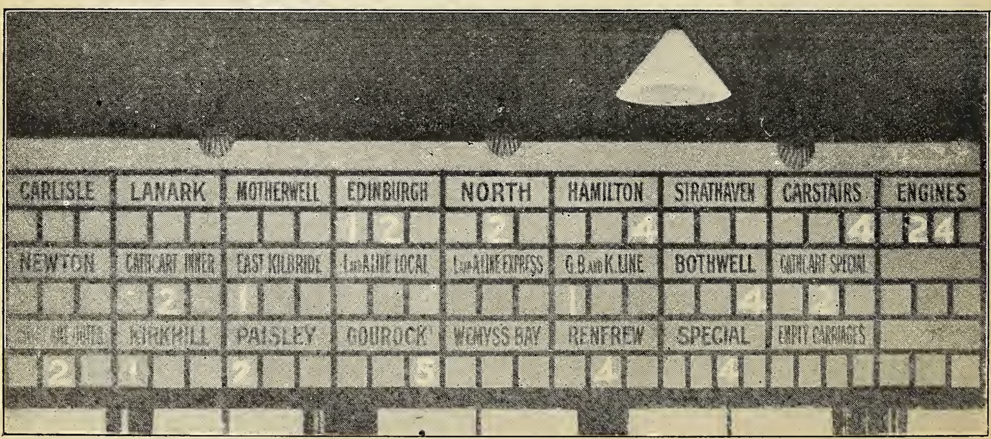
SIGNAL GANTRY AT THE CENTRAL STATION, SHOWING NEW TYPE OF 'DIRECTING INDICATOR' BENEATH THE SEMAPHORE POSTS.

it is, *i.e.*, Cathcart, Edinburgh, etc. The diagram remains so lighted up until the train passes. In the incoming direction a very similar electrical device is in use. It is, however, as will be seen in the illustration at the bottom of this page, divided into a number of squares representing the various lines and branches from which the trains arrive, Ardrossan, Gourock, etc. The next signal box gives notice of the approach of a train by ringing a bell and causing the correct square of the diagram to show illuminated on it the line on which the train is coming.

The new box controls all points within a radius of 600 yds, 300 yds. on each side, and signals still further off. Outside the 300 yds. radius, right inside the station at the end of the docks, are several scissors crossings. These are worked by the shunters when necessary by small ground frames, which are electrically controlled from the signal box. Telephonic communication is also provided between the shunters and the signal box.

So far are the signalmen from the station that they cannot be sure whether platforms are occupied or not. To overcome this difficulty, it is proposed to track circuit all the rails in the station, and to have an illuminated diagram in the box, which will show any portion of the line occupied as dark. But in the first place this will necessitate the wheels of all stock being bonded, which is an operation that will take both time and money to carry out. In the meantime a substitute has been found by placing a man in the centre of the station in a "crow's nest," whose duty it is to keep the "dock clear or empty" indicators in the operating box in the correct positions. He is connected by telephone with the signalmen, so that he can make any other communication he wishes to them.

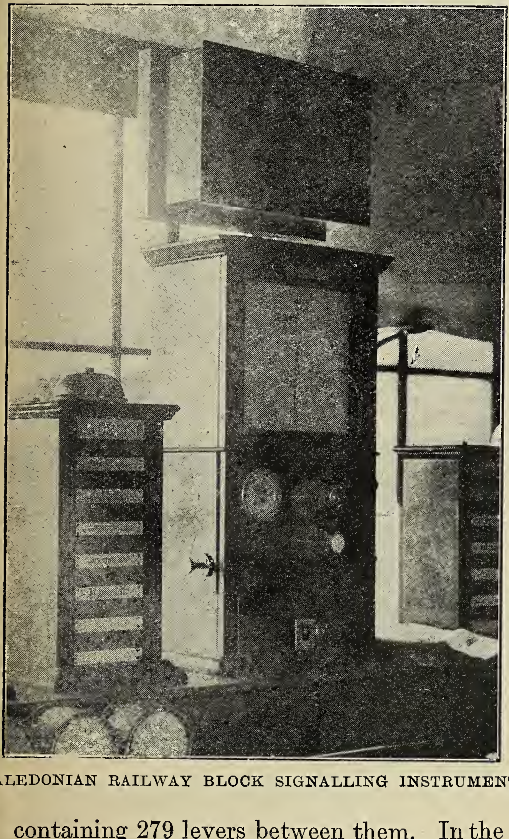
A new feature has been introduced into the outside signalling. At all junctions it is usual, of course, to have as many signals as there are divergent lines, the signal on the right applying to the line on that side, and so on, sometimes three or more signals being applicable to trains proceeding from one line. At Glasgow Central station, however,



ELECTRICALLY OPERATED TRAIN INDICATOR IN THE NEW SIGNAL CABIN.

only one signal is provided in such cases. Below each signal is a box-like apparatus with the lower half of the front removed. Into the aperture left a number will drop, simultaneously with the signal, representing the line on which the train will run. At night these are illuminated. In this way a great number of signals have been dispensed with, and practically every chance of the drivers confusing signals has been eliminated.

As before mentioned, the centralized electro-pneumatic installation takes the place of three boxes worked by manual labour and containing 279 levers between them. In the new box not only is time saved, giving the signalman an extra moment or two to think out his moves, for a difficult crossing can be set in two-thirds the time it used to take, but the saving in manual labour is a great thing. Formerly a man after his eight-hour shift would be quite tired. Now he comes off duty nearly as fresh as when he started, for the levers in the new box can be pulled over with a single finger; and probably the most arduous part of his duty now is brain-work, planning to save delay. The old boxes used to be worked by 12 signalmen and 10 booking and telegraph boys. The new box is worked by 8 men and 4 boys, 3 signalmen being on duty at one time during the busy hours. Among the various other benefits which it is expected to realise by the centralisation of the three old boxes, the fact that there will be only one head to manage the problem of the traffic instead of three perhaps working on different lines, must contribute very greatly to safety, efficiency and celerity in the working. In foggy weather this will be greatly appreciated, when all the shunting movements are confined in one box.


ALEDONIAN RAILWAY BLOCK SIGNALLING INSTRUMENT.

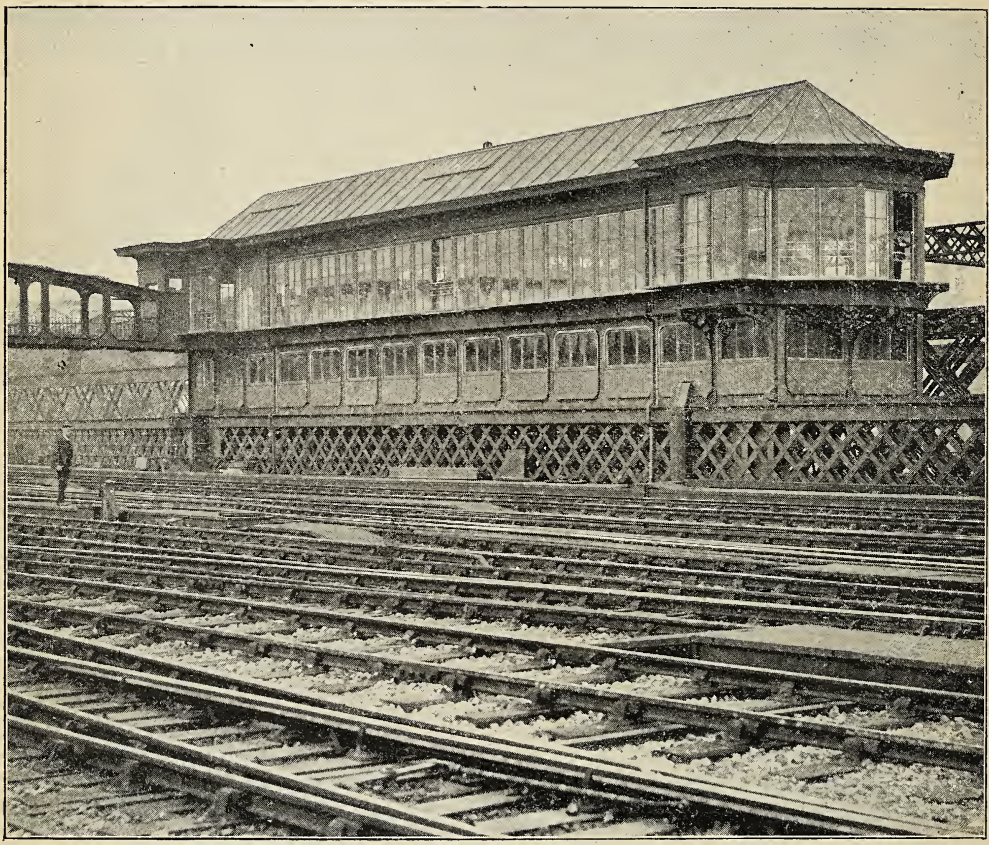
In the new station there are 13 platforms, 8 of which will accommodate two ordinary trains, as well as two docks used for theatrical and fruit traffic, and various sidings used for engines and carriages. Approaching the station there are originally three " main " lines at Bridge Street Junction, half a mile distant. Between this and the station these are increased to five, from which access to the platforms is obtained. It is, therefore, easily understood that it is no simple matter to divert a train from the line on which it may be travelling into one of the 13 platform lines. As a matter of fact, in a large proportion of cases, other lines are unavoidably fouled, and on this account, unless the trains are very carefully arranged, the signalman, no matter how smart he may be, runs the possibility of delaying other trains. Who has not been " held up " outside a large terminus at one time or another? From the complaints one hears it is evident that the majority of people do not appreciate the difficulties confronting a signalman placed in such a large and important box. He may delay a local train to give an express a through road, or possibly an express to allow another important train—very likely with connections down the line—to get a punctual start. But the signalman in doing all this has to calculate his moves beforehand very much like a chess player, only the game in this case is played much quicker and is vastly more exciting, and it is quite likely that the train on which he depended will be a minute or even more late. Naturally his plans, very often arrived at only after careful consideration in the short time at his disposal, are thrown out, and delays occur. But the men in the more important boxes are so intelligent that it is seldom they make a serious miscalculation.

There is probably no better training ground in all the world than a signal box to make a man sharp to obey. Dilatoriness and " Oh, I'll do that later on," are perforce almost unknown, for the block bells *must* be answered immediately, the signals *must* be pulled off and put on again without delay, and telephones *must* be attended to. 'To hesitate is to be lost' in a signal-box. The signalman, keeping in his mind how the expresses are running, often has to decide at a moment's notice a delicate traffic question. Probably his decision is correct, but occasionally, of course, unforeseen circumstances arise (they do very often on railways), which cause delays.

One of the greatest advantages of the new system is the small space required for connections to signals and rods. In the majority of cases these are laid underground. So much space has been saved by this on the Clyde Bridge that it has been possible to lay an extra line across.

The increase in the number of levers which are now used is accounted for by the provision of extra facilities. Shunting and wrong road signals have been provided which were not in use previously. In particular these are a welcome addition to the safe and smooth working of the station. Besides these, a new through crossover has been provided. In the old days an engine requiring to get from one side of the station to the other had to go to Bridge Street Junction, half-a-mile away.

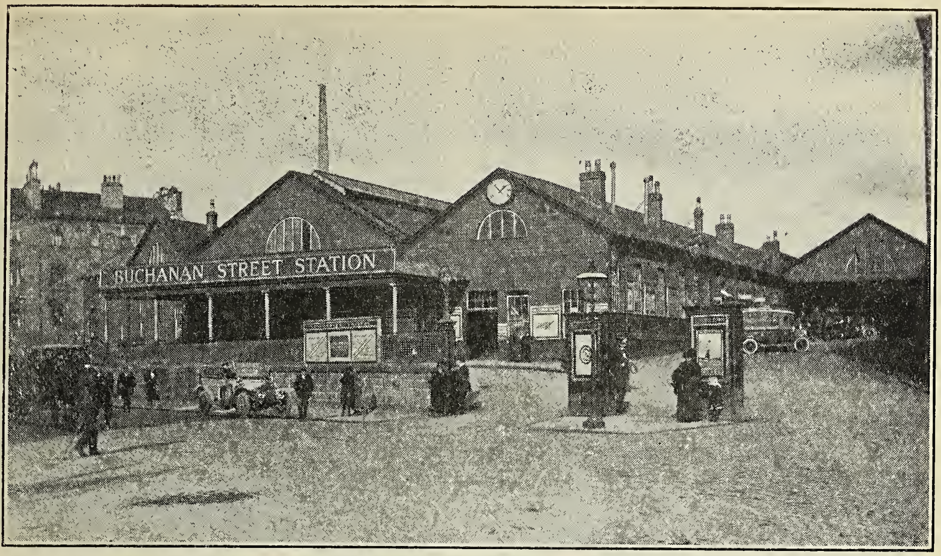
During Glasgow Fair week, the busiest time of the year, and during which five-sixths of the inhabitants of the "Second City of the Empire" depart on holidays, the usefulness of the new box was demonstrated in a striking manner. Never before has the immense traffic been worked so smoothly or so punctually.



EXTERIOR OF THE NEW SIGNAL BOX AT GLASGOW CENTRAL.

Colonel Yorke, of the Board of Trade, made a two days' inspection, and after this exhaustive examination expressed himself thoroughly satisfied. In conjunction with the officers of the Caledonian Railway, the work was carried out by Messrs. Mackenzie & Holland, Ltd., the well-known signal experts of Worcester, and the Westinghouse Brake Company; the signalling business of these firms now being carried on under the title of "The McKenzie, Holland, & Westinghouse Power Signal Company, Ltd."

Jan: 1928



GENERAL VIEW OF PASSENGER STATION.

Notable Railway Stations and their Traffic.

BUCHANAN STREET, GLASGOW, L.M.S.R.

By J. F. GAIRNS, M.I.Loco.E., M.Inst.T.

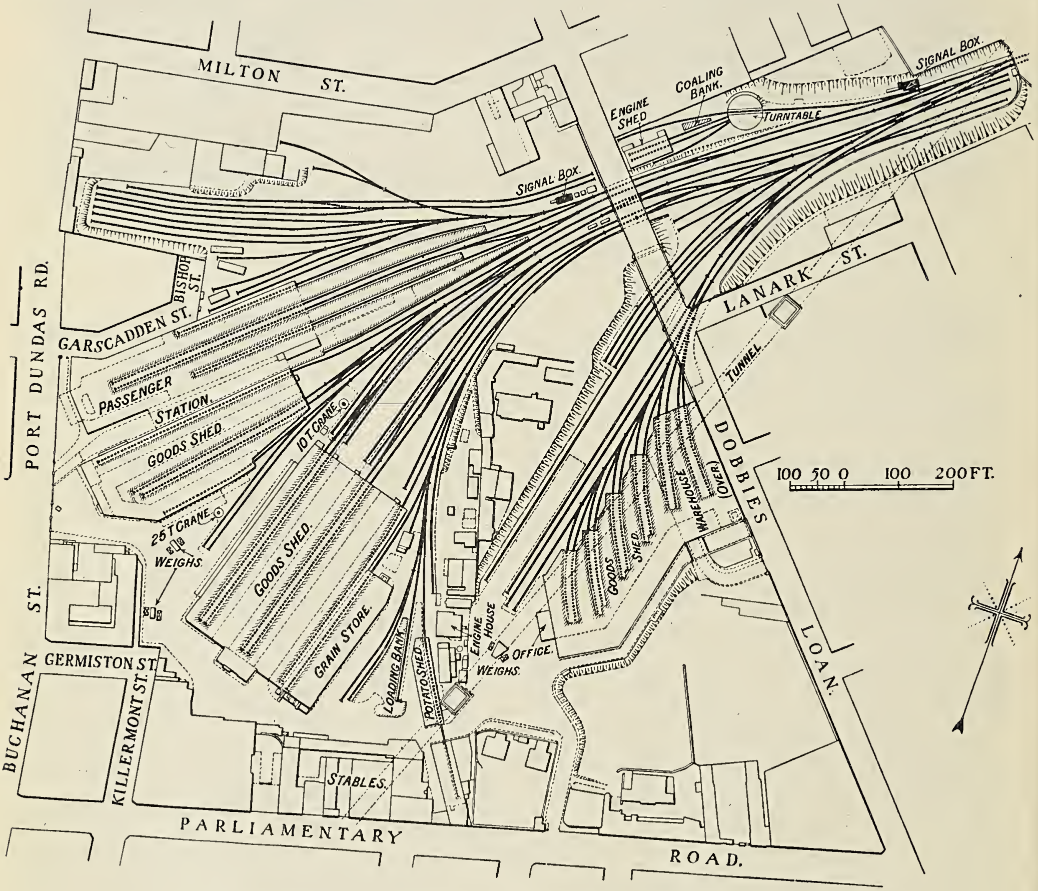
Buchanan Street Passenger Station.

UNLIKE most of the stations which have received attention in these articles, Buchanan Street passenger station, Glasgow, has no claims to architectural noteworthiness; it is not particularly large, having but five platforms; the number of trains dealt with does not reach a large total; and the opinion is sometimes expressed that it needs reconstruction before it can be described as convenient for the operation of traffic or suitably equipped for the reception of the considerable numbers of passengers who use it. Further, it is located in a somewhat "drab" part of Glasgow, surrounded by mean streets and tenement buildings, on the borders of the industrial area, while the fact that alongside it is the huge goods depot of the same name tends to detract from, rather than to add to, its "notability" in the sense in which that term is generally employed—to suggest interesting buildings, up-to-date design, lay-out and equipment, and magnitude and variety of traffic.

Yet, admitting all this, Buchanan Street passenger station is an important one to the L.M.S.R., in that it deals with practically all the by-no-means inconsiderable traffic of the Glasgow-Perth-Aberdeen and Dundee route, together with that of the Oban and Inverness lines; its trains serve quite a number of intermediate junctions with lines which possess substantial traffic interest; nearly all its trains include Pullman restaurant-car facilities and are made up of modern stock; it is not really so far removed from the central districts of Glasgow as many people imagine, in that the other end of Buchanan Street is quite close to St. Enoch and in its course it passes near to the relatively aristocratic Central station; it serves a route which includes Glasgow's first railway, and is historically important; and the adjoining goods station ranks as the largest and busiest in

Scotland. Indeed, whether readers agree that Buchanan Street passenger station can correctly be described as "notable" or not, there can be no question that that term is justifiably applied to the goods depot, while the fact that they are so closely associated calls for their consideration together.

It will be recalled that Glasgow's first railway was the Glasgow, Garnkirk and Coatbridge. This was opened in 1831, commencing at a point near the present St. Rollox station (about half a mile from Buchanan Street), and connected with the Monkland and Kirkintilloch (opened 1826) at Cumbernauld. In due course, connections were made by the Wishaw and Coltness with the Caledonian Railway as it was constructed from Carlisle to Carstairs and thence to Garriongill Junction, while the Scottish Central Railway, with its extensions and connections, provided for train services in the Stirling and Perth direction, so that it was to St. Rollox (in 1848) and to Buchanan Street (in 1849) that Caledonian trains ran from England when the West Coast route was completed. The English traffic, indeed, continued to use Buchanan Street for 30 years, in that it was not until 1879 that the better-known Central station became available therefor (Greenock and coast-line traffic was handled at Bridge Street, near the present Eglinton Street station). Buchanan Street was, therefore, the principal Caledonian station in Glasgow for quite a long period, which explains why its headquarters' offices were located there. These offices adjoin the goods depot, and certain



PLAN OF BUCHANAN STREET PASSENGER AND GOODS STATIONS.

departments still use them, though, since the formation of the L.M.S.R., others are accommodated at Central and St. Enoch stations. Since 1879, however, Buchanan Street passenger station has dealt only with traffic between Glasgow and Stirling, Perth, Dundee, Aberdeen, Inverness and Oban (except for a few local services, those to Hamilton being the only ones involving a diverging route), all other Caledonian routes being served by Central station, while the through services between England and Stirling and beyond are generally conducted separately, using lines between Law Junction or Wishaw and Greenhill, which enable them to avoid central Glasgow altogether.

Buchanan Street station is located at the northern end of the thoroughfare of that name, at the junction of Buchanan Street, Port Dundas Road, West Nile Street and Cowcaddens Street. Approached *via* Buchanan Street, the old chief offices are first encountered ; beyond and behind them is the goods depot, and directly adjoining, along Port Dundas Road, is the passenger station. Between it and the goods depot is a wide cab road leading to a covered cab yard on the up arrival side. This approach also leads to a covered yard for cabs bringing passengers, the yard being railed off from the public road and having an exit at the junction of Cowcaddens Street with Port Dundas Road.

From this courtyard access is had through two doorways to the booking hall, where there are seven booking windows, classified for the issue of tickets as usual in Scotland. To the left, partially along the arrival side of the station, may be noted telegraph office, shop parcels section, outwards parcels and left luggage offices, and lavatories, while a little further along is the inwards parcels office. These all have outside access to the arrival cab road, so that parcels traffic can be loaded or unloaded direct to or from vans under cover.

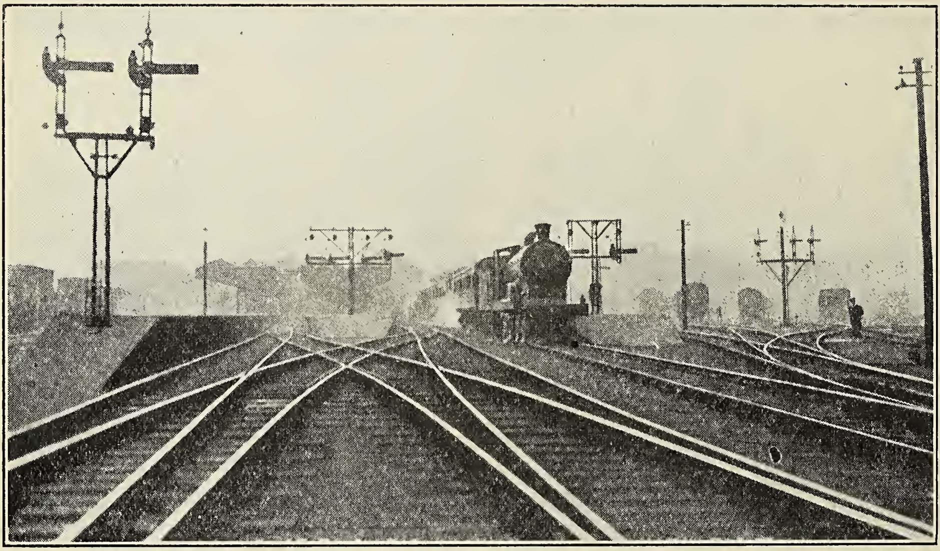
Behind the booking offices are the bookstall, tobacco, confectionery and fruit stalls, and in the corner, adjacent to the departure platforms, refreshment and tea rooms. Beyond, following No. 2 platform, are the stationmaster's office, ladies' waiting room, fruit stall, bookstall, with staff offices, one for the supply of pillows and rugs to night passengers, other waiting rooms, lavatories, &c.

Of the five platforms, two only extend right up to the circulating area, these being Nos. 2 and 3, behind the buffer stops of which is a big train indicator. No. 1 extends for about two-thirds only of the length of No. 2, and commences beyond the point where the station offices along No. 2 terminate. No. 4 is double-sided, commencing near the inwards parcels office on the arrival side, while No. 5 is merely an open platform, generally allocated for milk traffic, though at busy times it is also used for passenger traffic. The respective lengths of the platforms are :—No. 1, 571 ft. ; No. 2, 702 ft. ; No. 3, 655 ft. ; No. 4, 530 ft. and 651 ft.; and No. 5, 405 ft.

The roofing is of old-fashioned type—the station, as a whole, merits this description in many respects, as indicated by the extent to which timber enters into its construction—and is of longitudinal gable design, with three rows of supporting pillars, the main gables having smoke vents over the principal lines. Beyond this roof ordinary platform shelters are provided along the platforms between Nos. 1 and 2 and Nos. 3 and 4, the outer ends of these platforms and the whole of No. 5 being uncovered.

On the departure side there are eleven carriage sidings, but several of these are short, owing to the need for fitting them into a somewhat restricted and awkwardly-located area. All traffic within station limits is controlled by the station signal box, though shunting movements, which are numerous, often involve also the services of the Tunnel box, about a quarter of a mile beyond. By that time, however, connections are made with the goods depot lines, in that all tracks, for both passenger and goods stations, have to merge into two through the tunnel between Buchanan Street and St. Rollox stations. The station box, which has just received a new frame, has 98 levers and the tunnel box 53.

Signalling is the ordinary manual, and involves several interesting signal structures. Owing to the number of movements requiring use of both the up and down lines, each platform has two starting signals, respectively to the down and the up lines, and some of these are suspended from the supporting framework instead of upon it as usual, a feature which will be seen from the photographs reproduced. This arrangement is adopted for constructional convenience or to meet sighting requirements. Just beyond the station is Dobbies' Loan Bridge, and on the further side of this are two signal groups. One includes the down starting signal and four up signals covering movements from the down line to platforms Nos. 1, 2, 3 and 4. There are also two smaller arms governing movements into the carriage sidings. The other combination, of three arms, allows up trains to enter platforms Nos. 3, 4 and 5.



GENERAL VIEW FROM OUTER END OF PASSENGER STATION.

It will thus be seen that the passenger station is necessarily operated mainly on the basis of arrival and departure traffic, but this is not a serious factor as the large majority of the trains are of a main-line character, so that movements before departure and after arrival are chiefly of a shunting character, while the signalling is relatively complete, so far as signal control of shunting movements is concerned.

Except for about a dozen trains daily each way to and from Hamilton, or a portion of the route, practically all trains dealt with at Buchanan Street follow the Stirling and Perth route, though some do not go all the way, and it will be best to indicate the principal characteristics of the traffic thus involved by considering the trains in order, on the basis of the summer arrangements.

In the down direction (omitting the Hamilton trains), the day's work commences with the 5.50 a.m. stopping train to Perth. At 7.15 a.m. a Pullman car express leaves with a section for Dundee as well as for Aberdeen. At 8 a.m. a popular train leaves for Larbert, Stirling, Dunblane and the Oban line. This is followed by a stopping train at 8.5 a.m. to Perth. At 8.45 a.m. an express leaves for Larbert and Stirling, where it is combined with a section from Edinburgh, and continues to Gleneagles, Crieff and Balquhidder. At 9.15 a.m. an express leaves for Perth and Dundee, and at 9.45 a.m. the Oban section of the 10 o'clock group leaves for Oban. The 10 a.m. proper is one of the principal Aberdeen services, making its first stop at Gleneagles, while the following Inverness train at 10.10 a.m. calls at Stirling instead, on the way to Perth. The 10.25 a.m. is a stopping train to Larbert and Alloa, with a section detached at Lower Greenhill for Denny.

Then comes the 12 o'clock group, consisting of the 12 noon express for Aberdeen and the 12.10 p.m. for Oban. These are followed by the 12.15 p.m. stopping train to Perth, the 12.45 p.m. Saturday train to Cumbernauld, and the 12.55 p.m., not

Saturdays, to Glenboig. The latter train, by the way, is largely used by passengers returning home for the midday meal, as is so usual in the large Scottish cities.

At 1.5 p.m. there is, on Saturday, a Gleneagles, Crieff and Balquhidder and Callander express, divided at Dunblane, and at 1.30 p.m. there is another Aberdeen express, followed at 1.40 p.m. by a combined Dundee and Inverness express, with a further section detached at Stirling for Dunblane and the Oban line. At 1.47 p.m. a Saturday train leaves for Stirling. The 2.30 p.m. to Cumbernauld is replaced on Saturdays by the 2.50 p.m. to Glenboig, and at 4 p.m. there is a semi-fast train for Gleneagles and Crieff and for Callander, divided at Stirling.

At 4.30 p.m. there is a local to Glenboig, in front of the 5 o'clock group of trains, consisting of the 5 p.m. for Aberdeen and Dundee, the 5.20 p.m. for Oban, and the 5.30 p.m. which divides at Lower Greenhill to serve Stirling and Dunblane and Denny. The 6.5 p.m. is still another Aberdeen and Dundee express, while the 6.15 p.m. is a local to Cumbernauld. At 8 p.m. a stopping train leaves for Stirling and Gleneagles, and at 9.5 p.m. there is another local for Glenboig.

At 10 p.m. the night mail leaves, this including sections for Aberdeen and Inverness (with sleeping car), and mail and parcels vans. It is combined with the Edinburgh section at Dunblane. Except on Saturdays, the day is completed by the 10.40 p.m. local to Glenboig, but on Wednesdays and Saturdays this train is preceded by the 10.35 p.m. semi-fast for Larbert and Stirling.

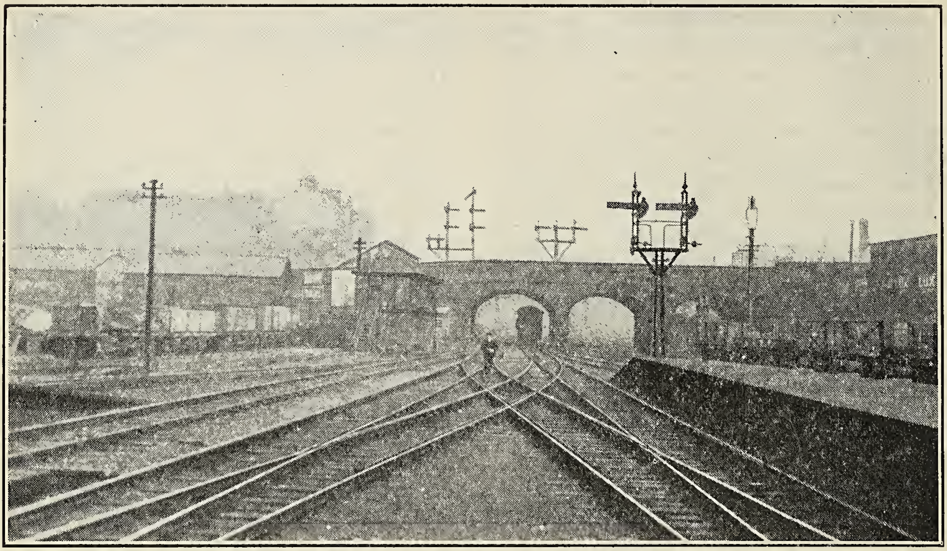
In view of the fact that the long-distance trains mentioned give services to all principal stations and junctions on the respective routes by connections, if not by one of the trains in each group, the result is really a generous service of inter-city facilities, and it is mainly the fact that these are all on related routes, and that there is no call for extensive local and suburban services that prevents Buchanan Street from ranking among the busy terminal stations as well as the important ones. Moreover, all the chief trains in the group, except the 10 p.m., have Pullman restaurant-car facilities to Aberdeen and sometimes to Dundee, Oban and Inverness also, while they are often quite heavy trains, calling for double-heading, and are all made up of modern corridor bogie stock.

Analysing the service, we find that there are trains for Aberdeen at 7.15, 9.15 (Saturdays only, changing at Perth), 10 a.m., 12 noon, 1.5 (Saturdays only, change at Gleneagles), 1.30, 5, 6.5 and 10 p.m. Dundee has through trains or connections at 7.15, 9.15, 10 a.m., 12, 1.40, 4, 5 and 6.5 p.m. There are through services to Inverness at 7.15, 10.10 a.m., 1.40 and 10 p.m., with Pullman restaurant cars for part, if not the whole, of the journey, and a sleeping car on the night train, while Oban has the 8 a.m., 9.45 a.m., (first-class Pullman observation car, Glasgow to Oban), 12.10, 5.10 (Pullman restaurant car, Glasgow to Oban), and 10 p.m., with several other services to Callander and those *via* Gleneagles and Crieff to Balquhidder.

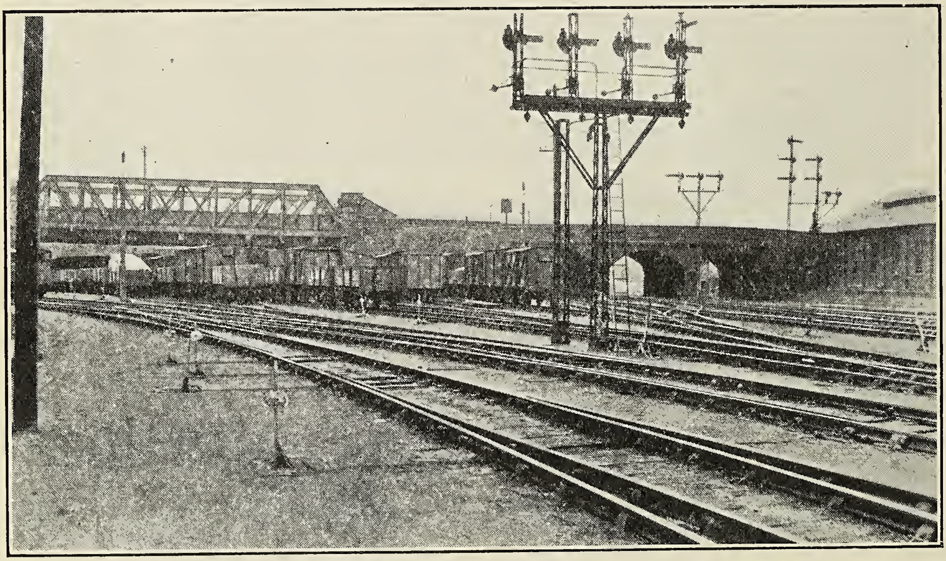
In the opposite direction the characteristics generally correspond, so that the trains can be reviewed in list form, on the basis of the arrivals scheduled in the summer services.

a.m.	
8.33	Stopping train from Perth.
8.56	Semi-fast from Perth.
9.18	Residential express from Callander.
9.38	Semi-fast from Alloa.
9.50	Residential express from Crieff and Gleneagles.
10.30	Express from Dundee.
10.55	Express from Stirling (portion of express from Aberdeen).
p.m.	
12.36	Stopping train from Dundee.
12.45	Express from Dundee.
1.35	Express from Oban.
1.50	Express from Dundee.
2.16	Local from Cumbernauld (return mid-day lunch train).
2.30	Express from Aberdeen.
3.15	Express from Aberdeen.
3.53	Saturdays only, from Larbert.
4. 7	Express from Aberdeen.
4.20	Express from Balquhidder and Gleneagles
4.32	Local from Cumbernauld.
4.38	Express from Oban.
4.50	Express from Inverness.
5.15	Express from Aberdeen.
6. 0	Stopping train from Larbert.
6.22	Express from Crieff and Gleneagles.
6.44	Express from Aberdeen.
7.15	Express from Aberdeen.
7.54	Local from Cumbernauld.
8.22	Express from Oban.
8.40	Local from Larbert.
9.15	Express from Inverness.
9.24	Express from Aberdeen.
9.50	Express from Oban.

During the winter months many of those



STATION SIGNAL BOX, SHOWING DOBBIES' LOAN BRIDGE AND SIGNALS.



GOODS STATION LINES BEYOND DOBBIES' LOAN BRIDGE.

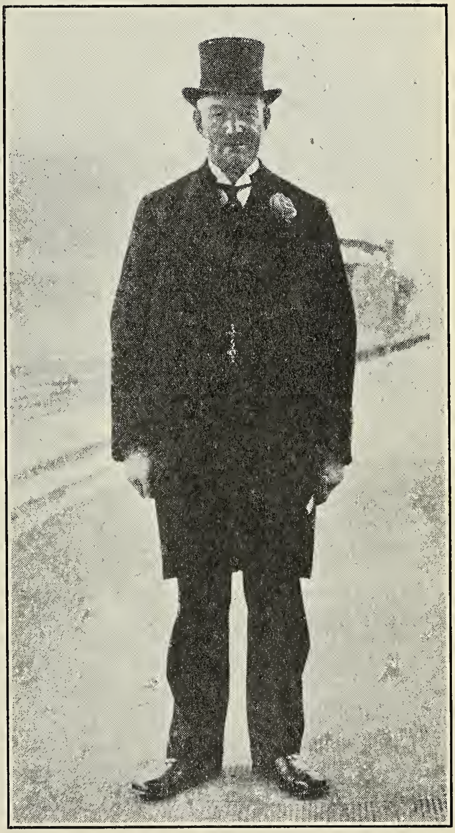
trains which form groups, including Aberdeen, Dundee, Inverness and Oban sections, are combined, so that the winter arrangements are correspondingly lessened, though the Aberdeen and Dundee expresses are heavy all the year round. It is, however, occasionally necessary to duplicate such trains, and when there are public holidays, although not in the summer season, relief and divided trains become the rule, especially when a Saturday is included. Thus, for the last Glasgow Fair Holidays, there were 14 additional trains on the Thursday, 19 on the Friday, and 15 on the Saturday. The need for duplication also arises in the summer season, when very large numbers of passengers are dealt with. For instance, on a recent summer Saturday, the following sequence of trains had to be handled :

p.m.		
7.23	From	Aberdeen.
7.30	,,	Oban.
8. 0	,,	Inverness.
9. 9	,,	Inverness.
9.21	,,	Dundee.
9.27	,,	Aberdeen.
9.50	,,	Oban.
10.10	,,	Aberdeen.

These were, moreover, all heavy trains, so that it was necessary to detach the rear vehicles in the case of some of them and place them elsewhere for unloading, as the main trains were too long for the platforms to which they were brought, while it is usual, at such times, if the trains are double-headed, as is frequently the case, to detach the pilot at Milton Road Junction (St. Rollox) so as to save platform space at Buchanan Street.

Besides the standard passenger trains, there are several transfer services between Buchanan Street and Central. Thus, a parcels train leaves Central at 8.27 p.m., and is due at Buchanan Street at 8.57 p.m., making a circuitous route, with parcels for the north. There is also one from Central at 10.55 a.m., which also brings the Pullman restaurant car for the 1.30 p.m. to Aberdeen. This is due to the fact that the Glasgow portion of the 7.50 p.m. from Aberdeen runs to Central instead of Buchanan Street. There is also a fish train from Buchanan Street at 6.35 p.m. to Central, and at 10.42 a.m. a milk train arrives from Carstairs and the south. There are also occasional other trains not conveying passengers, so that, in the summer, Buchanan Street can be a very busy station, and all the year round it has its pressure periods. It is, however, essentially a long-distance traffic station, and, as such, is extensively used by business travellers, as well as by tourists and holiday-makers. It is used by a number of local season-ticket holders, and by substantial numbers of longer-distance residential travellers, particularly those residing at Larbert, Stirling, Dunblane, Crieff and Callander and intermediate stations, while a fair number travelling more or less frequently between Glasgow and Gleneagles use Buchanan Street.

Mr. Robert Walker Kelly, Stationmaster, entered Caledonian Railway service at Broughton, on the Peebles branch. He served as a guard for 12 years, including three as a through guard on the London trains, after which he became an Inspector at Glasgow (Central). He was



MR. R. W. KELLY,
Stationmaster,
Buchanan Street, Passenger Station.

then Stationmaster at Bromfield, on the Solway line, and at Cleghorn, after which he returned to Glasgow (Central) as Assistant Train Inspector, attached to the Divisional Superintendent's Office. He was then Joint Inspector at Carlisle for four years, and Assistant Stationmaster at Glasgow (Central) for five. He was appointed Stationmaster at Buchanan Street in 1919.

His staff at Buchanan Street includes 2 Inspectors, 13 clerks, 2 foremen, 8 signalmen, 4 ticket collectors, 3 excess luggage collectors, 19 porters, 5 porter guards, 12 guards, 10 shunters, 2 left luggage attendants, 5 female linen equippers, and 1 parcels van man. Parcels cartage is done by Wordie & Co., while the refreshment rooms are under Mr. Turier.

ENTRANCE TO BUCHANAN STREET GOODS STATION.

Buchanan Street Goods Station.

The main entrance is between the passenger station and the old headquarters offices, behind which it extends. It covers an extensive area, and is in three main sections, each having its own group of shunting lines until they merge beyond Dobbies' Loan Bridge to join the passenger lines at the mouth of the tunnel up to St. Rollox.

The three main sections are known, respectively, as English Forwarding, Scottish Receiving and North of Scotland Forwarding, and English Receiving and Local Foundry. There is also a large granary and a potato shed. The three sheds together can accommodate 268 wagons under cover, the granary and potato shed bringing the total to 290, while 194 further wagons can be loaded or unloaded in the open. Some 10,500 consignments are handled daily, a tonnage of about 2,000 per day. Transfer traffic amounts to about 500 tons.

The station is concerned only with merchandise of a general character, coal and other special traffic being dealt with elsewhere. It is, however, affected to some extent by seasonal traffic, particularly fruit, which represents big totals in the aggregate. About 20 wagons of fish are also handled daily. Crane power is available up to 20 tons. There are 13 booked trains leaving the station daily, with about 400 wagons, and 18 are due in, bringing about 500 wagons. In a day in September the actual numbers were—Received, 563 wagons; Despatched, 424 wagons. The train departures include three for the Carlisle direction, one to Edinburgh and one to Perth (mainly for Highland traffic); and the arrivals, seven from the Carlisle direction, with others from Grangemouth, Aberdeen and Dundee. These trains are, of course, duplicated or amplified as required.

Among the principal departures are the 7 p.m. for Carlisle, conveying traffic for delivery in Liverpool, Manchester, &c., next morning; and the 7.8 p.m. for Inverness, giving deliveries next morning in the north of Scotland; also the 7.45, 10.45 p.m. and 12 midnight trains for England. All these trains are operated in view of the special point made by the L.M.S.R. of providing for next-morning deliveries wherever practicable, a service upon which great stress is laid.

Each of the three main sections has a goods shed capable of accommodating 63, 95, and 88 wagons respectively, while a veranda, forming an annexe to the centre shed, accommodates 22 wagons, and the granary and the potato shed each gives further covered accommodation to 14 and 8 wagons, respectively, a total of 290 wagons under cover. In addition, the number of wagons which can be in position in the open for loading and unloading is 194.

Each of the three sheds has an overhead warehouse, and is equipped with hydraulic or electric hoists. A good part of the warehouse space is, however, let to private traders, especially that used for the storage of biscuits, printing paper, chocolate, soap, condensed milk and other goods, the stocks of which are drawn upon as required to meet local requirements.

There are six lorry weighing machines, in three sets of two, with office between, while there are hydraulic cranes on all the loading banks in two sheds, with overhead electric cranes in one of the sheds. About 457 lorries arrive in the station with loads for despatch daily, and about 585 loads are allowed.

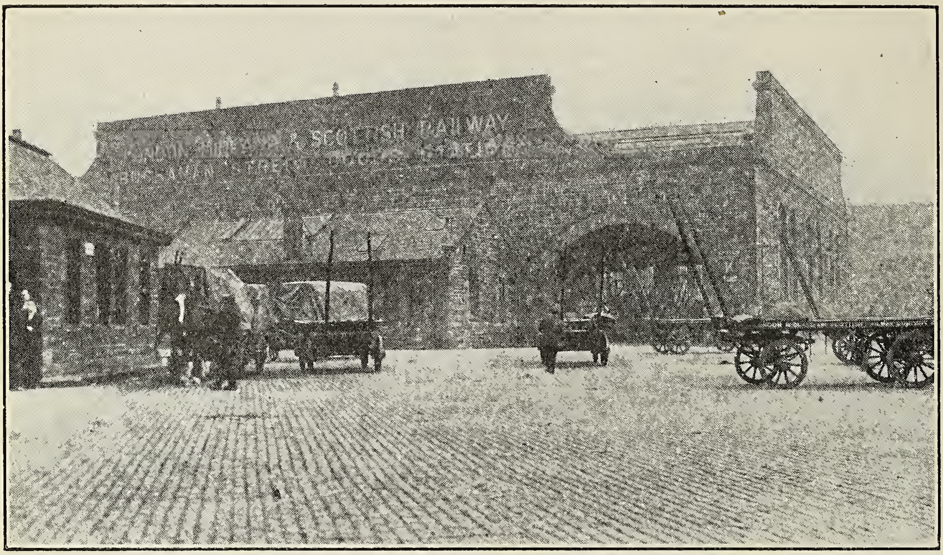
Cartage is done partly by Wordie & Company, which firm has, from the very earliest days, been so closely associated with the Caledonian Railway, but most is done by railway company's teams. The great majority of the traffic is still horse-hauled, which is particularly suitable, not only for miscellaneous working in the streets of the industrial and trading districts of Glasgow, but also suits the policy of standing the lorries for loading and unloading, detaching the horse after a lorry has been placed in position and attaching it only when the load is made up. About 200 railway horses and 150 of Wordie & Co.'s are regularly employed. There are also five railway motor lorries, while those of Wordie & Co. work to and from Buchanan Street as required, also horse-drawn and motor vans of other firms who deliver to or collect from Buchanan Street themselves.

Entering the station from Buchanan Street the building seen to the left accommodates the Public Inquiry, Order and Discrepancy Offices, and upstairs the Claims Department. Behind that and directly alongside the passenger station is the English Forwarding Shed, which has three loading tables or decks signified by the letters "A," "B," and "C," and has also under its roof a line of rails with roadway permitting of loading and unloading direct from or to road vehicle and rail vehicle. Passing farther into the station one sees two lines of rails in the open suitable for unloading or loading a rougher class of goods. Here also is seen the crane with the highest lifting capacity, which the station possesses.

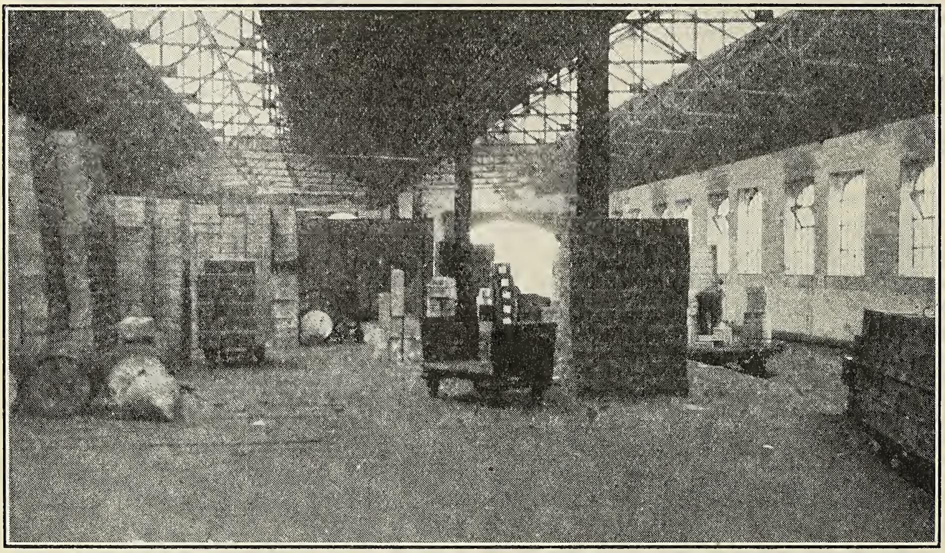
Proceeding farther into the station there is now seen a three-storey building which accommodates, on the ground floor, the Cartage Office, and the Shipping Correspondence Office. On the first floor is the Superintendent's Office, Cashier's and the General Offices. On the top floor is the Shipping Office. Behind this block of buildings is found a shed with five platforms, two centre roadways serving four of the platforms and an outside roadway with veranda serving one platform. These platforms are designated "D" "E," "F," "G," H." The five lines here found under cover accommodate 95 wagons. In this shed is dealt with traffic from Scottish stations generally, and traffic to the Scottish stations situated north of Glenboig.

Passing still farther into the station there is seen the Granary, a building of five storeys, with a floor capacity of 8,000 square yards. It is equipped with hydraulic jiggers, chutes, and electric lift. It has inside accommodation for 14 wagons and suitable siding accommodation outside.

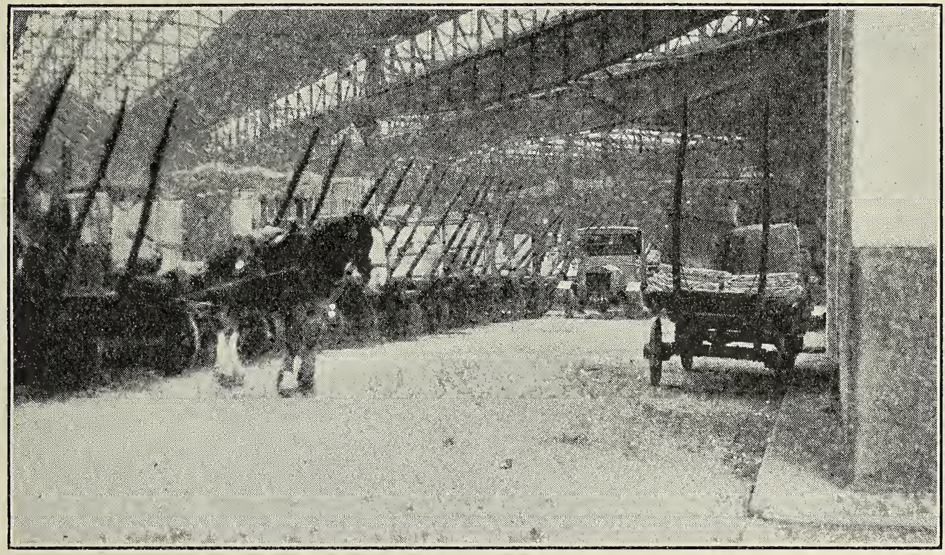
Beyond the Granary is a double-sided outside loading bank accommodating 17 wagons, and next to that is the Potato shed (8 wagons). In this area is found the pump house, where the hydraulic power for the cranes and hoists is regulated by an



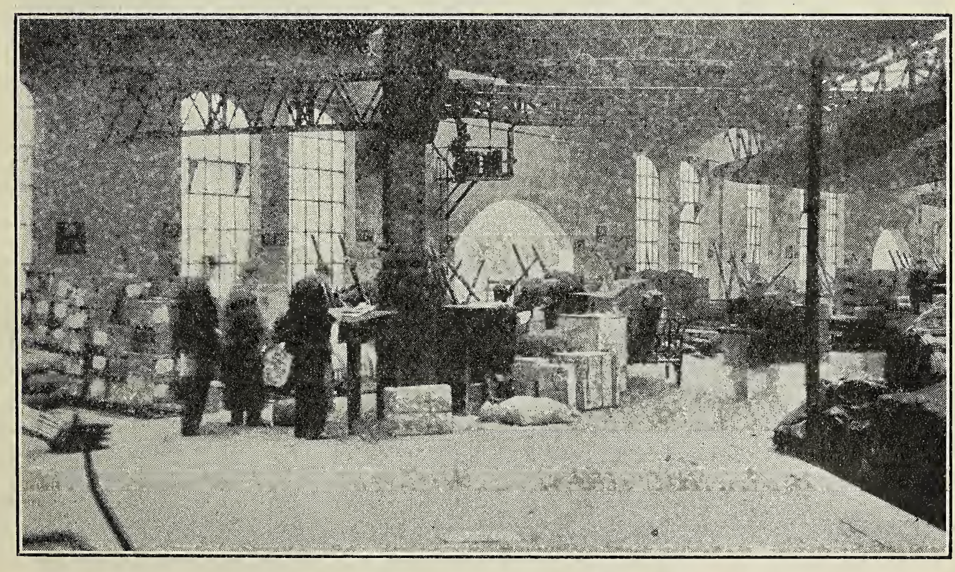
EXTERIOR OF "K" SHED.



WAREHOUSE FLOOR OF "K" SHED



LORRIES STANDING FOR LOADING IN "K" SHED.

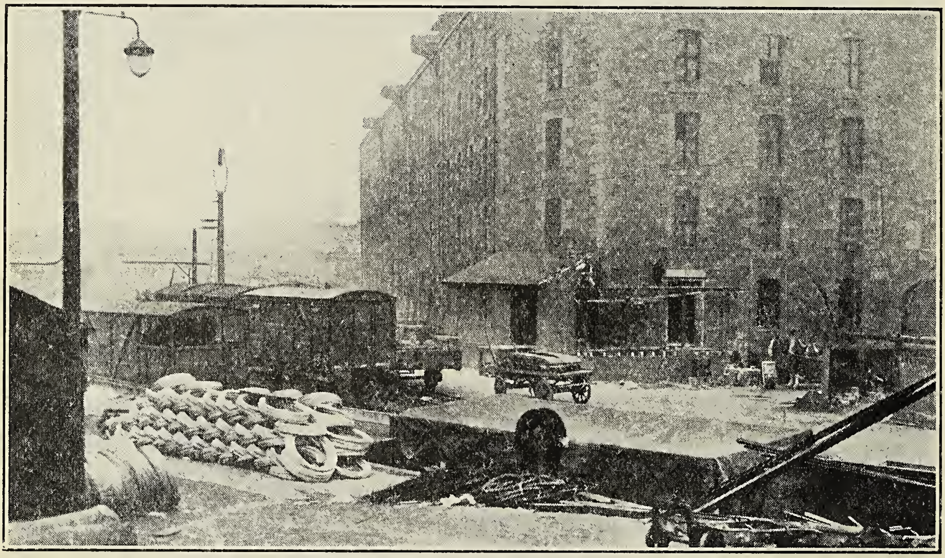


ON THE LOADING PLATFORM IN "K" SHED.

automatic electrical installation. In this section is found a number of storage sidings taking in 64 wagons. Next we see a wide roadway giving direct access as between road vehicle and wagons, 39 of the latter being accommodated on each side of the roadway.

We are now confronted with the third shed, called the "K" shed. Here is dealt with the traffic from England, and the traffic to the local Scottish stations. The shed has 12 platforms, together accommodating 88 wagons. All the lines emerge through stepped walls to an outside shunting neck, the lines terminating inside in "echelon" fashion, the platforms between all joining on to the main distributing platform, itself at an angle to the tracks. There is a cart road outside this platform, so that quite lengthy lorry standage and road space is available, while a barrow stage enables any wagon to be reached from any part of the shed. There are three overhead electric travelling cranes of two tons' capacity.

The building is rather curiously located, in that while it is on a level with the adjoining street—Parliamentary Road—the storage above the shed is on a level with Dobbies' Loan, thus giving cartage access to the store. This position has been reached by excavation into the rising ground. The "K" shed is particularly well adapted for the "stand-loading" of lorries, as each lorry can be reached by barrow from any part of the shed. The Delivery Office, in charge of Mr. Lockhart Mitchell, is attached to this shed.



THE GRANARY.

From the respective goods sheds the shunting lines extend through different spans of Dobbies' Loan Bridge, and each is able to deal with its own shunting movements independently until connections are made beyond this bridge with connections towards the running lines from the passenger station and the tunnel up to St. Rollox. Beyond the bridge there are also sidings for shunting facilities. For two of the three shifts into which the day is divided four shunting engines are continuously employed, and three for the third shift. The yards are known, respectively, as Old, Middle and New. Train engines also render a little assistance in the final making up of trains and in the initial breaking up of those arriving. A good deal of transfer from one shed to another is done by exchanging wagons through the shunting necks. There are 34 platform weighing machines, located as required.

Goods traffic is handled for the most part by hand-barrows of two-wheeled "rack" type, but use is made of several electric trucks. Incidentally, a Karrier motor sweeper is used for sweeping the cart roads and the open portions of the depot. Hoists are freely provided to connect the loading banks with the warehouse floors.

The English shed has 25 hydraulic cranes of 30 cwt. capacity, and three for loads of 6 cwt. The Scotch shed has 36 of 20 cwt. and four of 40 cwt. capacity, all hydraulic, while the three overhead electric cranes in the "K" shed can deal with 40-cwt. loads. A good feature of each of the sheds is the amount of daylight received through the glazed roofs.

The Agent in charge at Buchanan Street is also responsible for a number of sidings at points in the vicinity, whose traffic is associated with that of the main station.

Mr. G. S. Paterson is Agent in charge; Mr. Locke, Assistant; and Mr. Adam Anderson, Chief Clerk. There are 3 chief foremen, who, in turn, take charge of the work in general, and 3 shed foremen. The yard staff includes 3 yard inspectors, 2 yard foremen, and 23 shunters, porters and checkers numbering about 425. The clerical staff numbers 145. Financial and General Accounting is not, however, done at Buchanan Street, but at the General Accounts Office in Howard Street, Glasgow.

The station is bordered from Buchanan Street first by Germiston Street, alongside the headquarters offices, and then by Killermont Street at right angles, thus leading into Parliamentary Road, which constitutes the boundary as far as Dobbies' Loan roadway and bridge. There are, however, several intervening sections of non-railway property on Parliamentary Road, along which may also be noted the offices of the Horse and Carting Superintendent, a secondary entrance to the goods station, and the Northern Division Audit Office. From Dobbies' Loan there is a third entrance, that to the upper warehouse floor of "K" shed already mentioned. On the further side the area is, of course, bounded by the passenger station and arriving lines.

In conclusion, the writer is indebted to Mr. Kelly, Stationmaster; Mr. Paterson, Agent; Mr. Locke, Assistant Agent; Mr. Anderson and others for valuable assistance and much useful information on the occasion of his visit to and inspection of Buchanan Street passenger and goods station, and to officers of the L.M.S.R. in London and in Glasgow for facilities for observing the work done and for co-operation in other ways.

LARBERT—AN IMPORTANT SCOTTISH JUNCTION.

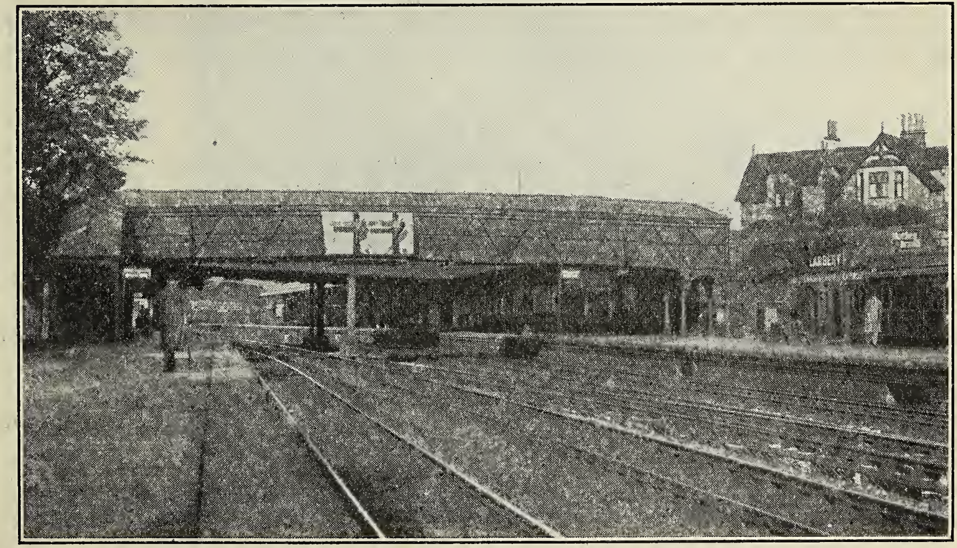
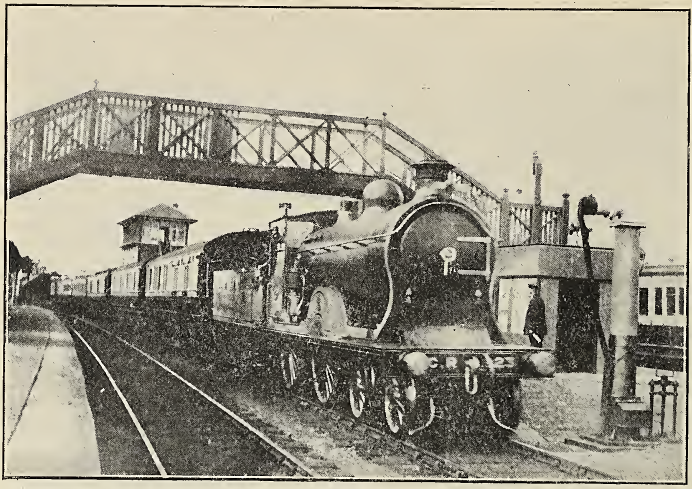
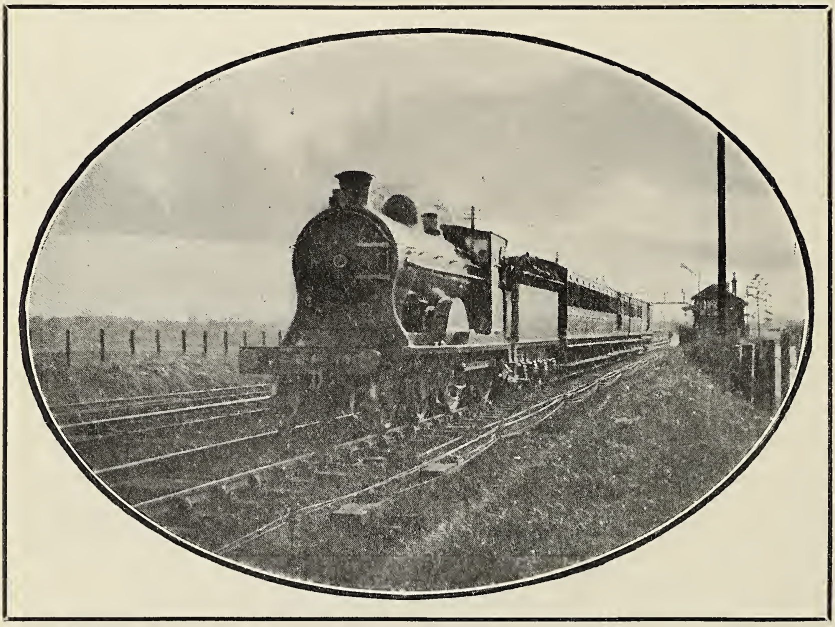


Photo.] [*J. F. Gairns.*



CALEDONIAN RAILWAY.

2 p.m. Edinburgh–Euston Express at Symington.
4-4-0 Locomotive No. 923.



Photo] CALEDONIAN RAILWAY. [*Mr. Tom M. L. Neish.*

Euston-Aberdeen Express passing Ardler, drawn by 4-4-0 Locomotive No. 140.

THE RAILWAY MAGAZINE.

MAY, 1905.

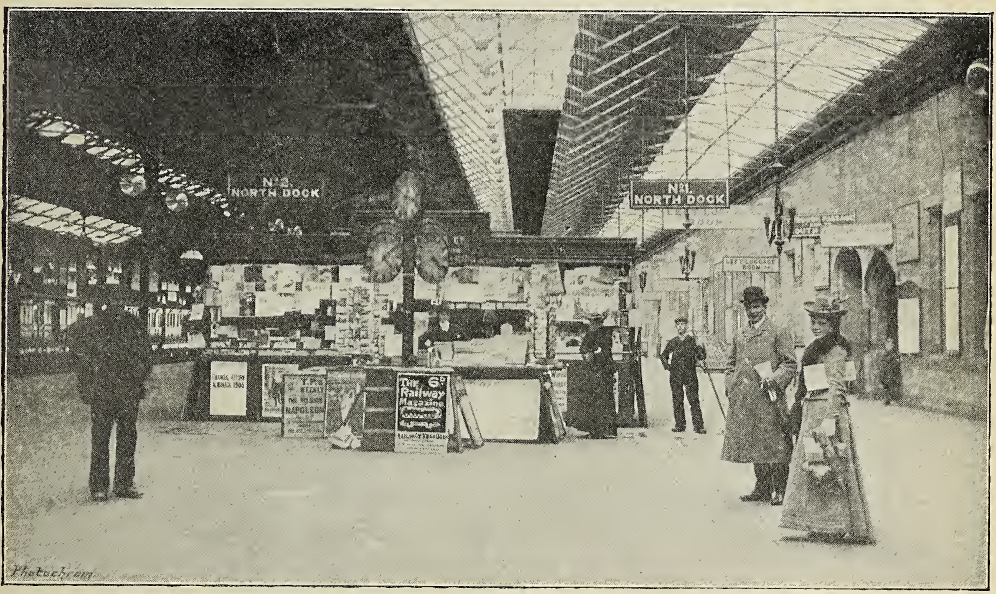
Notable Railway Stations.

No. 31.—PERTH GENERAL (JOINT).

(Caledonian, North British, and Highland Railways.)

By James Duncan Robertson.

PERTH (General) may well claim to be a notable railway station. In size it is one of the largest in the Kingdom, and being what might be termed the "Gateway to the Highlands," its position as a centre for through traffic is therefore very important. The Caledonian line from Perth to Forfar forms part of the old Scottish Midland Junction Railway and was opened in 1848. This company was then taken over by the Scottish North-Eastern, which amalgamated with the Caledonian in 1866. The opening of the Moncreiffe tunnel in 1848 enabled the Scottish Central's line from Stirling to form a connection at Perth with the Scottish Midland, and like that line they also joined the Caledonian in 1865. The North British line from Ladybank is also an old one, as it was a portion of the Edinburgh, Perth, and Dundee Railway before its amalgamation in 1847. Of the three railways whose trains run into Perth, that station forms a terminus for two—the North British and the Highland. For the Caledonian on the other hand the station is a through one, being situated on their main line between Carlisle and Aberdeen. The Highland Railway in reality terminates at Stanley, seven and a quarter miles north of Perth, but obtains access to Perth by means of running powers over the Caledonian line from that point.



CIRCULATING AREA AND BOOKSTALL, PERTH GENERAL STATION.

In the case of the North British Railway, running powers are also exercised over the Caledonian Railway between Hilton Junction and Perth, a distance of about two miles. The map on page 358 will give some idea of the various lines which converge on Perth. A close examination of this map will show that there are no fewer than ten main routes which have their centre at Perth. The Caledonian Railway claims six of these. From the south come their main line trains; from Edinburgh, Carlisle, and Glasgow,—all running over the same metals from Larbert to Perth. The Aberdeen Line comes in from the north, the Crieff branch from the west, with the Dundee Line from the east. The three North British routes enter Perth from the south, and comprise the direct line from Edinburgh by Forth Bridge and Glenfarg, the alternative route from Edinburgh by Ladybank, and the Glasgow Line *via* Alloa and Kinross. Like the Caledonian, these all run together into Perth, but only for the short distance of three and a half miles, from Bridge of Earn station. The Highland Railway has only one route from the north into Perth, but a very important one it is, as numerous connections have to be made with the other railways' trains at that station. The distance from Wick to Perth, 305 miles, is one of the longest stretches of main line in the Kingdom.

These connections form one of the difficulties which arise in the working of a through station like Perth. Some idea of these difficulties may be gained by a description of the shunting that is necessary on the arrival of the 7 p.m. Highland express before the connecting trains can be made up. The following are intended to connect with this train :—

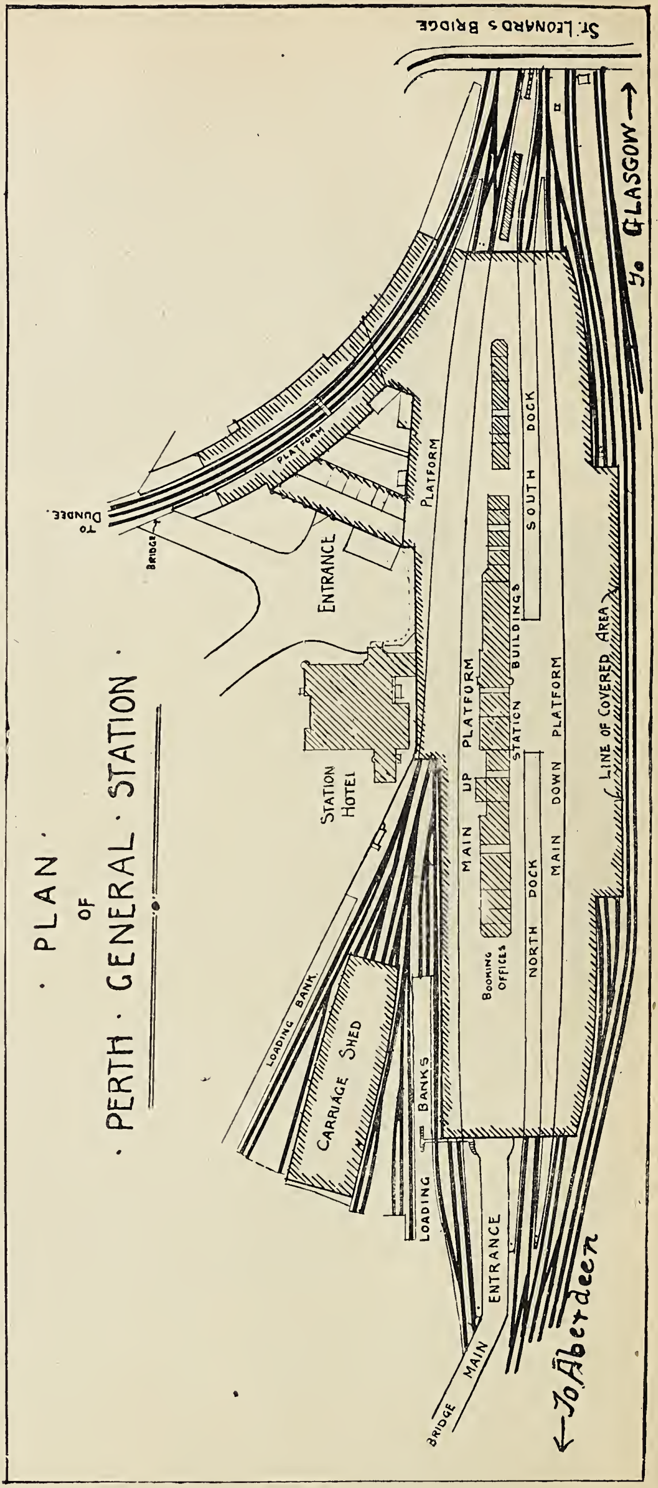
CALEDONIAN.

7.10	p.m. to Forfar.
7.15	,, ,, Dundee.
7.35	,, ,, Glasgow.
7.40	,, ,, Edinburgh and Glasgow.
7.40	,, ,, Crieff.
8.0	,, ,, London.

NORTH BRITISH.

7.15	p.m. to Ladybank.
7.30	,, ,, Glasgow.
7.55	,, ,, London.

This Highland train is generally a heavy one, and often has through coaches to



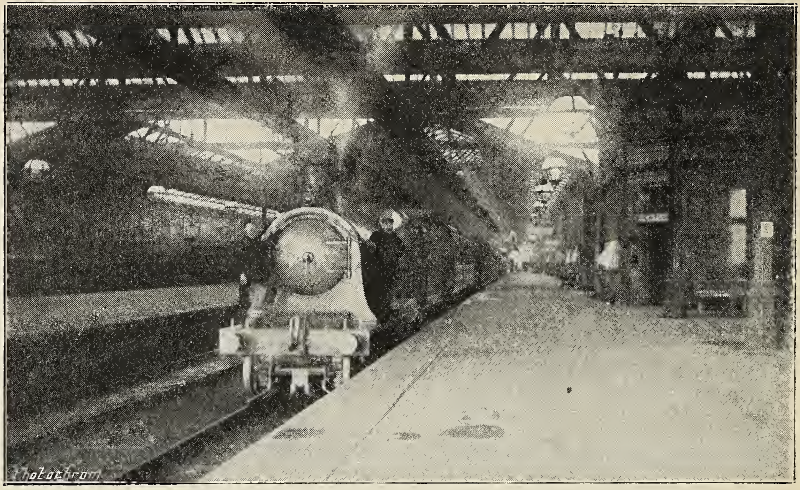
London for all three routes (West Coast, East Coast, and Midland), in addition to the through carriages for Edinburgh and Glasgow. On the arrival of the train at Perth the Highland engine takes off the through coaches for the East Coast and Midland (or "Waverley") routes, together with the through carriage for Edinburgh.

This carriage is then shunted into the platform from which the North British connecting train starts at 7.55 p.m. The local portion of the train is then backed in, after which the Highland engine again goes back to this platform and leaves the coaches o the last mentioned routes which must always be in front of this train, in order to facilitate matters at Edinburgh where it is divided. The West Coast carriages from Inverness are placed on a side line, next the main platform, until the arrival of the Aberdeen portion, to which they are then attached, and leave for the south at 8 p.m. The local carriages of the Highland Railway are drawn out of the station in the opposite direction, leaving the Glasgow through carriage standing on the main line. This carriage is then joined to the rear of the 7.30 p.m. Dundee train when it backs into the station. The Aberdeen portion arrives at 7.24 p.m., and on the engine being detached is pushed forward from behind and joined to the Dundee portion, the whole leaving for Glasgow at 7.35 p.m. It may be mentioned that this train runs from Perth to Glasgow without a stop, reaching Buchanan Street at 9 p.m.

This does not represent all the station work in connection with this Highland express, for very frequently there are a number of fish wagons conveyed by the train, and when that is the case, additional delay is incurred before these are disposed of. It should be mentioned that the above method of working this particular train only applies when the traffic is normal. In summer when the traffic is heavy, arrangements have to be made for running the Highland connections separately when very late, in order that the trains of the North British and Caledonian Railways may not be unduly delayed.

PERTH GENERAL STATION. THE HOTEL.

The train service at Perth (General), is naturally divided into two classes, those which are purely local trains, and the through expresses. The latter are of course the most important trains which pass through the station, and all of them are booked to stop there in the course of their journey The Caledonian expresses running between Glasgow and Dundee, are the only trains which do not change engines at Perth: the coaches for this service are composed of the Company's standard bogie carriages. The



NORTH BRITISH RAILWAY TRAIN IN SOUTH DOCK.

first passenger train into Perth arrives from Inverness at 5.5 a.m. This is a stopping train, and affords a service to Edinburgh and Glasgow from the local stations on the Highland Line. A sleeping car is also run on this train to Glasgow, Buchanan Street. The next arrival is the East Coast down express at 5.14 a.m., closely followed by the West Coast train at 5.20 a.m., the latter leaving for Aberdeen after a stay of five minutes. Half-an-hour later comes the West Coast postal train from London, due at 5.55 a.m. The timing of this train to Aberdeen is very fast, only 97 minutes being allowed for the distance of 90 miles, and in practice the journey is often performed at a mile a minute rate throughout.

The Highland express for the north then leaves at 6.15. a.m., conveying its portion of the mails brought by the postal train from London. After this there are no trains of importance until the departure of the East

THE DUNDEE LINE PLATFORMS, PERTH GENERAL STATION.

Coast express for London, at 8.35 a.m., while a West Coast train arrives at the same time. For the next hour or so the station is kept busy with the arrival and departure of the through expresses, together with the local trains, which mostly arrive before 9 a.m. Another East Coast express arrives at 8.55 a.m., closely followed by the West Coast train at 9.5 a.m., and the Glasgow express at 9.13. Then there are a number of trains departing at this time. The chief of these are :—

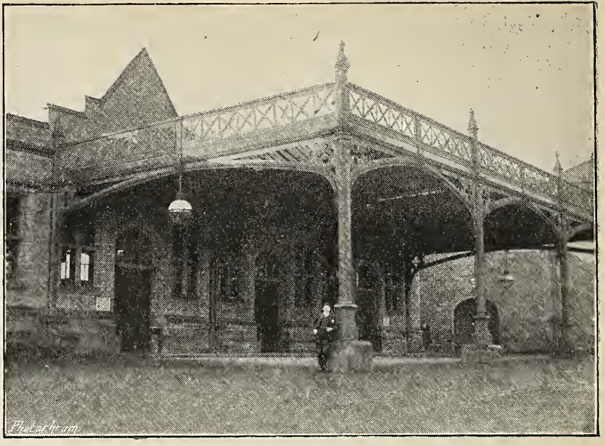
For London	.. 9.5 a.m.	by	West Coast Route
,, Crieff	.. 9.5	,,	Caledonian
,, Glasgow	.. 9.10	,,	,,
,, Dundee	.. 9.17	,,	,,
,, Aberdeen	.. 9.20	,,	,,
,, Edinburgh	.. 9.20	,,	North British
,, Inverness	.. 9.25	,,	Highland

NORTH BRITISH RAILWAY BOOKING OFFICE
CALEDONIAN RAILWAY BOOKING OFFICE
HIGHLAND RAILWAY BOOKING OFFICE
Photochrom

NEW BOOKING OFFICES.

There are few trains dealt with after this until eleven o'clock, but from that time till 12.30 the station is once more a scene of activity. There are two mid-day trains to London, leaving at 12.15 by West Coast Route, and 12.30 by East Coast and Midland, the latter being divided at Edinburgh, where it joins the connecting trains of these routes. Perhaps the busiest time of the day at Perth, is about 4 p.m. when a number of local trains depart, besides the expresses to Edinburgh, Glasgow, Aberdeen, and Dundee. There is a London train leaving at 4.4 p.m., but it is not so popular with travellers as the night trains, the time of arrival in London (3.50. a.m.) not being very convenient. This is followed by a fish train leaving at 4.20 p.m., which arrives in time for the morning markets in London, and several English provincial towns. Later on there is the south going postal train, from Aberdeen to London, which leaves Perth at 5.45 p.m., and reaches London only 26 minutes later than the 4.4 p.m. passenger train. The train service in the evening is very similar to that of the afternoon, but there are one or two trains which deserve some notice in addition to the Highland Express already mentioned.

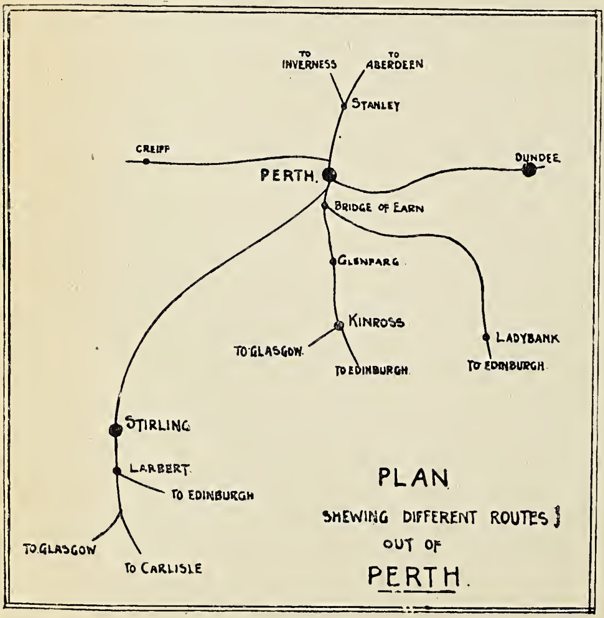
The 7.35 p.m. Caledonian express is the only train which does the journey from Perth to Glasgow without a stop, the time taken being 85 minutes; a good performance, seeing the road is not an easy one, and the train is often heavy. There are additional trains in summer time, which also accomplish this run without stopping. Another notable Caledonian train is the West Coast express, leaving for London at 8 p.m. This is the heaviest train out of Perth, unless it be run in two portions, and is nearly always worked by two engines of the well known "Dunalastair" class. The weight of this train often exceeds three hundred tons behind the tender, and its usual load is generally equal to eighteen coaches. Last of all come the night trains, the best known of these being the sleeping-car express to London by the West Coast route, leaving at 10.5 p.m. This is a very popular train, and is generally well filled. In summer the Perth portion along with the Highland connection is run in advance, the Aberdeen train following 15 minutes later. After the departure of this train a North British express from Edinburgh arrives at 10.36, and there is only one other arrival before



ENTRANCE FROM STREET TO THE DUNDEE LINE PLATFORMS.

midnight, this being a local train from Dundee, due at 11.30 p.m. The Glasgow express then arrives at 12.7 a.m., followed by the West Coast dining-car train, from London at 12.25. After the despatch of the Aberdeen and Dundee expresses at 12.35, the Highland Company's connecting train leaves at 12.50 a.m., and its departure brings the day's work at Perth (General) to a close. The service of trains on Sunday is made up of nine arrivals and ten departures. Only the most important trains have been dealt with in the above description of the service, but mention should be made of the excellent service of trains between Dundee and Perth, and the local trains on the North British to and from Bridge of Earn. The nature of the traffic at Perth may be said to consist of the through services to London by the East Coast, Midland, and West Coast routes, the Caledonian trains to Glasgow, Aberdeen, Dundee, and Edinburgh, the North British trains to Dunfermline and Edinburgh and the Highland Company's service to Inverness. A considerable amount of local traffic is also done at Perth, but at no time of day is there anything in the nature of a suburban service of trains in regard to it.

A very busy time for the station staff at Perth, is the fortnight before the 12th of August—the date on which the grouse shooting begins. The through traffic is then at its height, and extra trains are put on which often have to be duplicated in order to cope with the "rush to the North," as it is called, which takes place at this time The bulk of this traffic goes by the Highland Railway, and there are few stations indeed that can send out such a succession of express trains in the early morning as does Perth (General), in the first fortnight of August. Readers of "Ian Maclaren" will find in his *Kate Carnegie* a delightful sketch of what he calls "Muirtown Station" before the 12th of August. This is none other than Perth; and the writer's observing eye has not failed to catch sight of "one man . . . . . untiring, forceful, ubiquitous" presiding over a scene of "excitement and confusion." He is really a subaltern, but invaluable to his chief, and the travelling public, and "Ian Maclaren's" delineation of him is excellent and true to the letter.



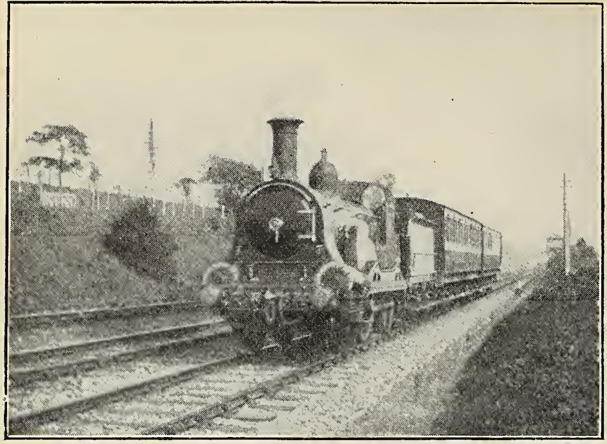
The station buildings at Perth cover a large amount of ground, and it is about the only station in the Kingdom which can compare with Edinburgh Waverley, as regards length of platforms and covered area. The length of the largest of the two main platforms at Perth (General) is 1,745 feet, which must run that of Edinburgh Waverley very close indeed, if not actually equal to it. The main entrance to the station is from the

Glasgow road, the other being situated at the Dundee platform on the east side of the station. The Station Hotel in which the railways are interested, is a very large building, and has a covered way adjoining one of the platforms. The best indication of the excellent management of this hotel is the fact that it is frequently patronised by Royalty. The refreshment rooms and the station offices are situated between the two main platforms, while there are three main booking offices, and extensive waiting-room accommodation for all classes of passengers. A new lamp room has recently been erected on the south end of the main platform, where a branch of the General Post Office is also located. There are several structural alterations at present in progress in connection with the station offices, but some time must elapse before these can be completed. The station staff numbers over two hundred men, of which a large number are porters, and the interests of the various companies are looked after by a committee of railway directors: In the summer months the number of trains dealt with during the twenty-four hours, averages two hundred, in addition to the numerous excursion trains which pass through the station at that time. The signalling arrangements at Perth are very complete, and owing to the large size of the station six signal cabins are required, the largest of these being situated at the south end of the main platform.

Mr. Burke, the able station superintendent, commenced his railway career on the Great North of Scotland Railway, and in 1900 was appointed from the Kilsyth and Bonnybridge Railway to his present position at Perth. Mr. Hardman, his assistant, came from the London and North-Western and Lancashire Railways Joint station, at Preston, and his knowledge of railways south of the Border makes him a valuable lieutenant.

MAIN UP PLATFORM.

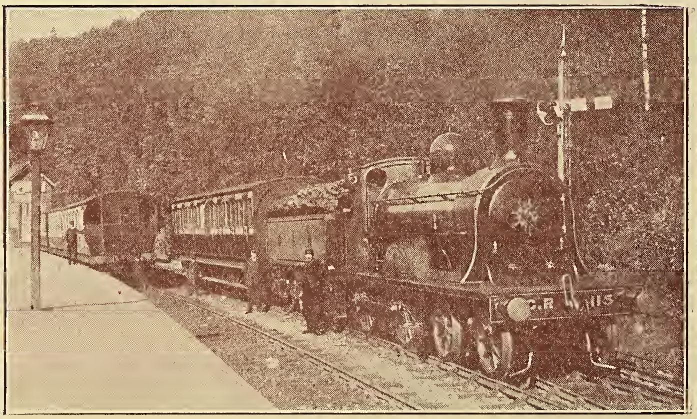
Before concluding this article, reference must be made to the celerity with which the trains are despatched from Perth, which, combined with a general smartness on the part of the whole staff in the discharge of their duties, reflects the greatest credit on the gentleman who so successfully, and with such acceptance to high and low, fills the position of station superintendent at Perth (General), large and unwieldy though the station be.



Photo] [*Mr. Tom M. L. Neish.*

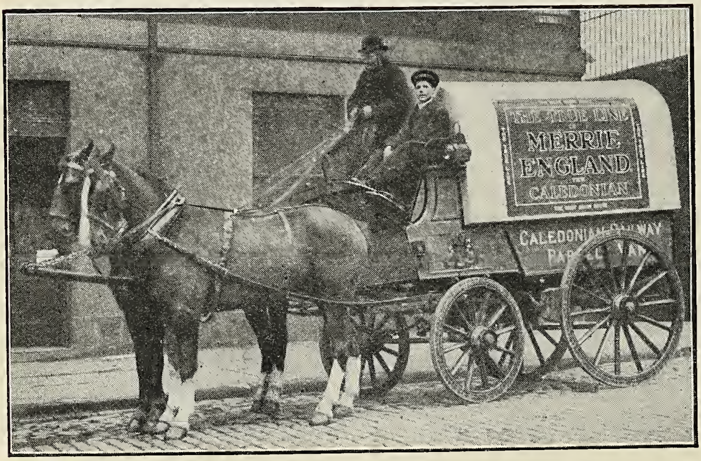
CALEDONIAN RAILWAY.

2.45 p.m. Dundee West-Glasgow Train passing Ninewells Junction. Engine No. 430.



Photo] CALEDONIAN RAILWAY. [*Mr. N. Devonshire Jones.*

4-4-0 Locomotive, No. 115, waiting at Dunblane for Edinburgh portion of 8.55 a.m. ex Oban.



A PARCEL VAN, BEARING ONE OF THE CALEDONIAN RAILWAY'S NEW POSTERS.

. . . THE . . .
Railway and Travel Monthly.

CONDUCTED BY G. A. SEKON.

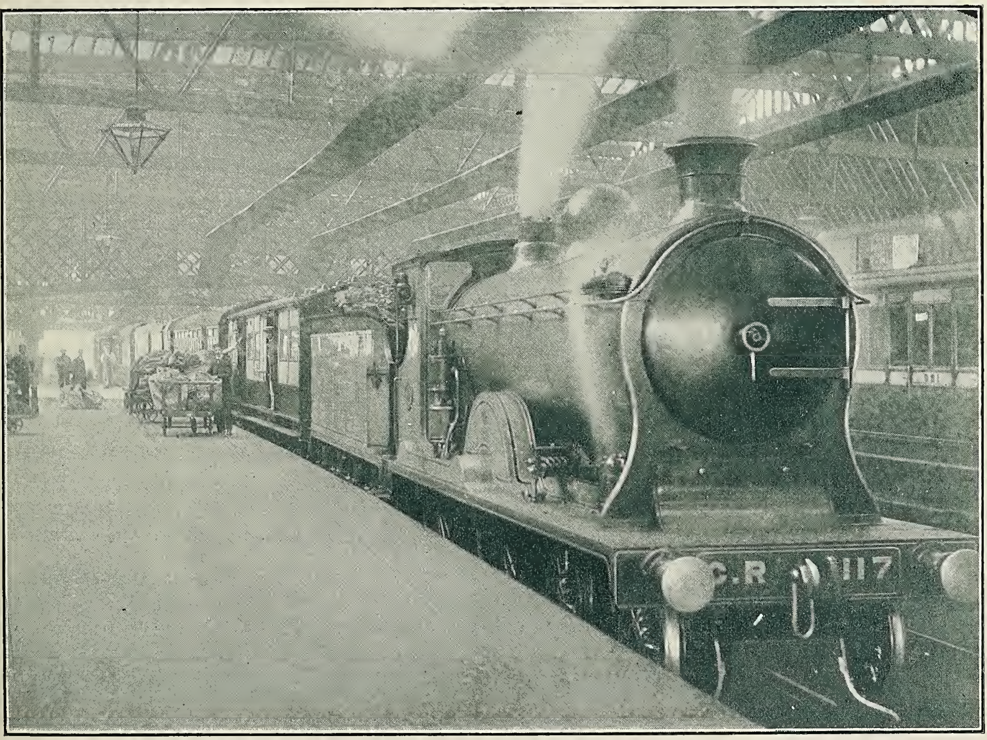
No. 41.] SEPTEMBER, 1913. [Vol. 7.

The Romance of Great Railway Stations.

No. 8.—PERTH (GENERAL).

By Charles C. Littlejohn.

OWING to the comparative smallness of its population and railway system when viewed alongside those of England, Scotland, on the whole, does not possess many stations deserving of the title " great." There are a few notable exceptions to this, however, and amongst the larger stations of more than local importance must be included one of the most celebrated, and certainly one of the most interesting railway centres to be met with throughout the United Kingdom, namely, Perth (General).



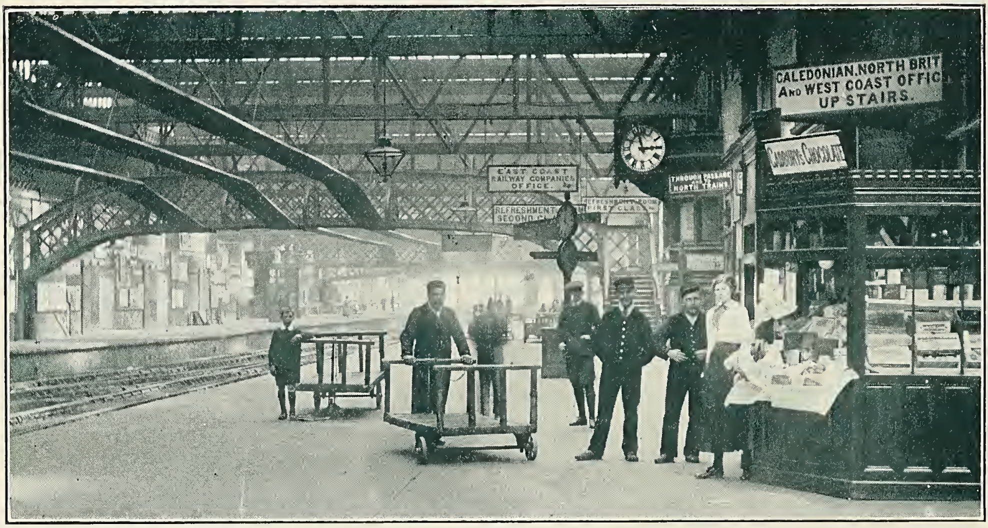
Ideal Studios,] *[Perth.*

ABERDEEN-EUSTON POSTAL LIMITED AT SOUTH END OF NO. 4 PLATFORM.

Perth depart 5.45 p.m.

It is perhaps only fitting and appropriate that the ancient capital of Scotland should maintain its prestige in these modern commercial times through its important railway station. Certainly few towns of its size are so readily accessible from all parts of Great Britain, in many cases without change of carriage, as the "Fair City." The romance of every great railway station is written largely in the class of traffic which passes through it, and few, I think, could be more cosmopolitan in this respect than Perth. Here practically the entire traffic for the Highlands from Euston, King's Cross, and St. Pancras, as well as the great industrial centres of the Midlands and the North, converges in the small hours of each morning, to be sorted out and dealt with, with a celerity which is nothing short of marvellous. All day long, too, a steady stream of traffic from North, South, East, and West flows in and out of Perth General Station, the whole forming a much more life-like panorama of human nature than any romance which a novelist could portray. Accordingly it is to the traffic passing through it, and not so much to the station itself, that this article will be principally directed.

The General Station, Perth, it may be advisable to state at this point, is the joint property of three railways, viz. the Caledonian, North British, and Highland, but of these three, only the first mentioned has direct access to the station by its own metals. Both the Highland Railway and North British Railway require to exercise running powers over the Caledonian Railway's main lines from the North and South respectively, before they can make use of the station: the former from Stanley Junction, 7 miles 18 chains north of Perth, and the latter from Hilton Junction, 2 miles 1 chain distant to the south. Aberdeen Joint Station is the only other station in Scotland to "house" three or more railways under the same roof. There four* out of the five principal Scottish Companies' engines may be seen, the exception in this case being, of course, the Glasgow and South-Western Railway. This may not appear very


CALEDONIAN, NORTH BRIT AND WEST COAST OFFIC UP STAIRS.
CADBURY'S CHOCOLATE
EAST COAST RAILWAY COMPANIES OFFICE.
REFRESHMENT SECOND CL
REFRESHMENT ROOM FIRST CLASS
THROUGH PASSAGE NORTH TRAINS

Ideal Studios,] CENTRE OF NO. 4 (MAIN UP) PLATFORM LOOKING SOUTH. [*Perth.*
No. 3 Platform on left.

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* The Caledonian, North British, Great North of Scotland regularly, and occasionally Highland Railway locomotives.

noteworthy to the English reader, accustomed to such cosmopolitan centres as York, Carlisle, etc., but it is of special interest in the Scottish railway world.

The management of Perth (General) is vested in a representative Committee, of which Mr. George G. Hamilton is Secretary and Treasurer, and it says a great deal for Mr. Hardman, the Station Superintendent, and his large staff, that everything about the Station is worked so smoothly and efficiently.

The principal routes into Perth will be best understood by anyone who is not personally acquainted with the district after a glance at the sketch-map on page 194. Briefly these may be summed up as follows :—

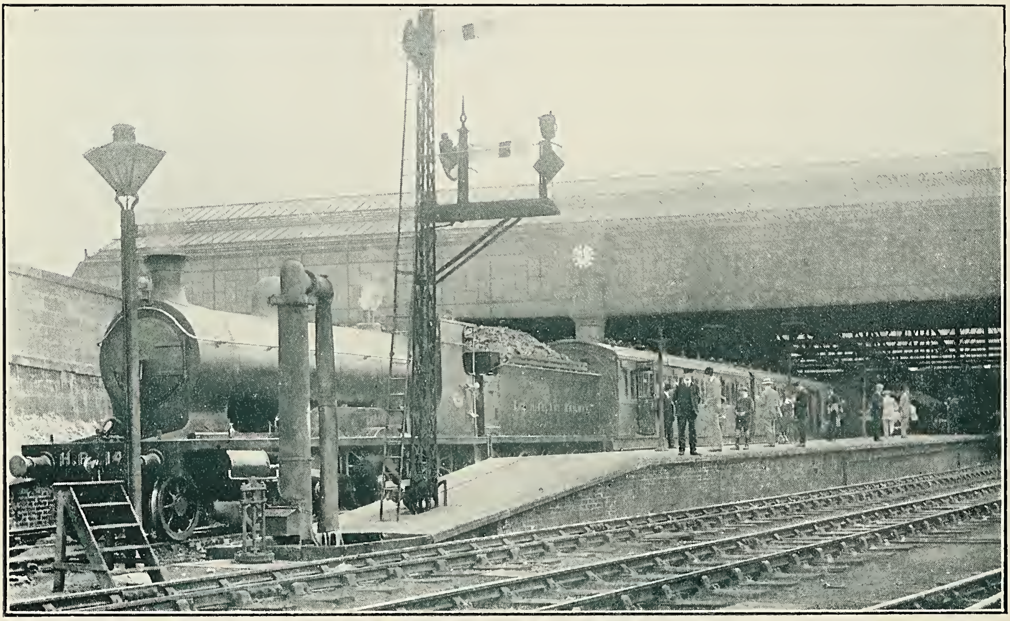
The Caledonian Railway's main line from Carlisle and the South (also from Glasgow, Buchanan Street, and Edinburgh, Princes Street), *via* Larbert ; the continuation northwards of the same to Aberdeen, *via* Forfar and Bridge of Dun ; the branch line to Dundee (West Station), *via* the Carse of Gowrie ; the branch to Crieff and Balquhidder, connecting there with the Callander and Oban Railway, and the short branch to Methven which leaves the Crieff line about 6 miles out of Perth. The North British Railway's main line trains from Edinburgh (Waverley) to Perth run *via* the Forth Bridge and Glenfarg, joining the Caledonian Railway's metals, as already stated, at Hilton Junction ; those from Glasgow (Queen Street) *via* Alloa Bridge and the Devon Valley join the Edinburgh line at Kinross Junction, and thence follow the same route into Perth ; and North British Railway local trains run between Perth and Ladybank (on the Edinburgh-Dundee Main Line) and to Dundee (Tay Bridge Station) and St. Andrews, *via* the Newburgh and North Fife Railway. In connection with the last mentioned branch, an interesting development was made last summer when two of the North Fife trains which formerly terminated at Dundee were continued forward to Carnoustie and Arbroath *via* the Dundee and Arbroath Joint Railway, and *vice-versa*. The East Coast of Forfarshire is a very popular holiday district with Perthshire people, and the new through service has been much appreciated by those who disliked the former necessity of changing stations at Dundee.

Ideal Studios,] [*Perth.*

THE CALEDONIAN RAILWAY'S 'GRAMPIAN' CORRIDOR LUNCHEON CAR EXPRESS, LEAVING NORTH END OF NO. 7 PLATFORM FOR ABERDEEN.

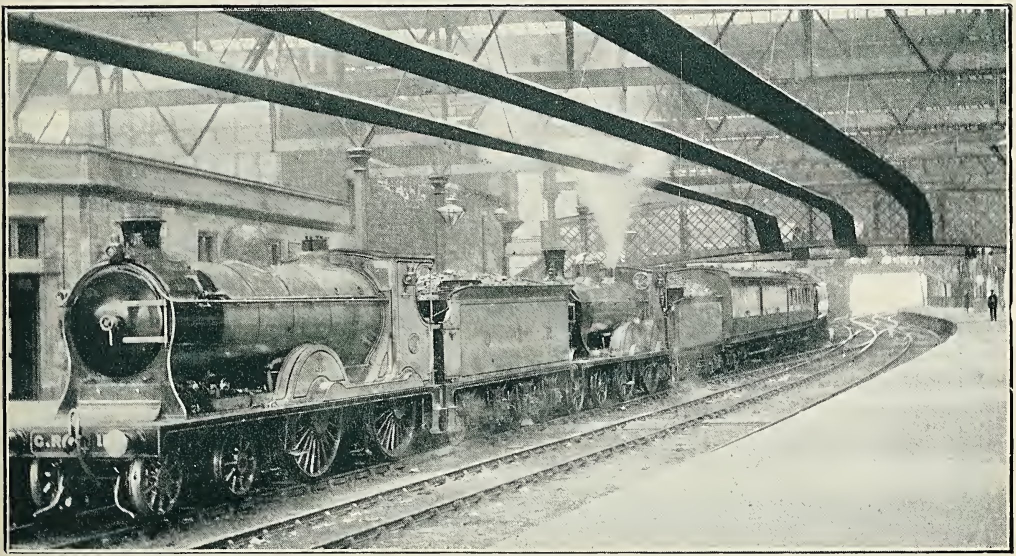
With regard to the Highland Railway, this Company has only one route into Perth—their main line from Inverness and the North *via* Dunkeld, which joins the Caledonian Railway main line at Stanley Junction. The Highland Railway trains may be roughly divided into two classes, viz.: the "Main Line" trains to Struan and beyond; and the locals to Blair Atholl. These will be dealt with more fully in the course of this article.

Having thus briefly described the routes, it now behoves us to turn to the Station itself. The General Station proper consists of one large island platform, some 1,745 feet in length, with two bays at either end, used by the North British trains and the Highland trains and Caledonian Railway locals to the Crieff and Methven branches chiefly. What is known as the Dundee section of the Station is a semi-detached portion to the east of the main Up platform, and gives rise to a rather peculiar method of working. The Dundee Station comprises an "Up" and a "Down" platform, both of which are situated on a sharp curve, but while the latter is used as a departure platform by all trains proceeding to Dundee (West), with a couple of exceptions, which we shall refer to later on, no ordinary passenger trains call at the corresponding "Up" platform. All such trains arriving from Dundee (West) run right through the "Dundee Station" at Perth without stopping to the junction with the main line, and thence shunt back into the General Station proper. This is done to facilitate the transfer of traffic and results in a considerable saving of time. A side platform, No. 3, which forms the western boundary of the Dundee Station, and is parallel with the general 'island' platform (see map on page 192), is comparatively little used for ordinary traffic.


Ideal Studios,] *[Perth.*

11.50 A.M. HIGHLAND RAILWAY EXPRESS TO INVERNESS, AT PLATFORM NO. 8.

The day's work at Perth commences in summer at 4.20 a.m. with the arrival of the Caledonian Railway's 1.15 a.m. (booked non-stop) from Carlisle (150¾ miles). This train is a through Sleeping Car Express from Liverpool, Lime Street (depart 10.10 p.m.), and Manchester, Exchange (depart 10.15 p.m.), and when required runs on to Aberdeen at 4.50 a.m., stopping only at Stonehaven for collection of tickets, and is due in the Granite City at 6.55. It is closely followed into Perth by the West Coast Highland Express (7.45 p.m. from London, Euston), which leaves Carlisle at 1.42 and reaches Perth (booked non-stop) at 4.48. This train conveys passengers for Perth and the Highland Line only, and has sleeping saloons for Inverness attached. When duplicated, the second portion is booked 10 minutes later throughout from Carlisle. The corresponding East Coast train, 7.55 p.m. *ex* King's Cross, comes in at 4.53, after an apparent non-stop run from Newcastle! Four minutes, however, are occupied at Edinburgh, Waverley Station (3.32-3.36), detaching the West Highland portion and replacing the North Eastern Railway engine by a North British Railway locomotive. At 5 o'clock the 3.55 a.m. *ex* Waverley (7.10 p.m. *ex* St. Pancras) arrives, and it is at this hour on an early August morning preceding the great "twelfth" that Perth General Station presents probably its most animated appearance. For it must be borne in mind that all these "Highland" Expresses are run in two, three, or even four portions every night from London about that period, and each requires to be dealt with in a different way according to the circumstances under which it reaches Perth next morning. Possibly no other trains in any part of the kingdom convey such a multitude of Peers and aristocracy nightly as the Anglo-Scottish trains we are referring to. "Specials," conveying large private parties from various parts to the Highlands, are not uncommon at Perth in the fortnight before the shooting season opens, testifying only too plainly to the hold which the festival of 'Saint Grouse' has upon the well-to-do classes. The Highland Railway takes forward the English trains at 5 a.m. and at 5.12, reaching Inverness at 8.35 a.m. and 9.8.



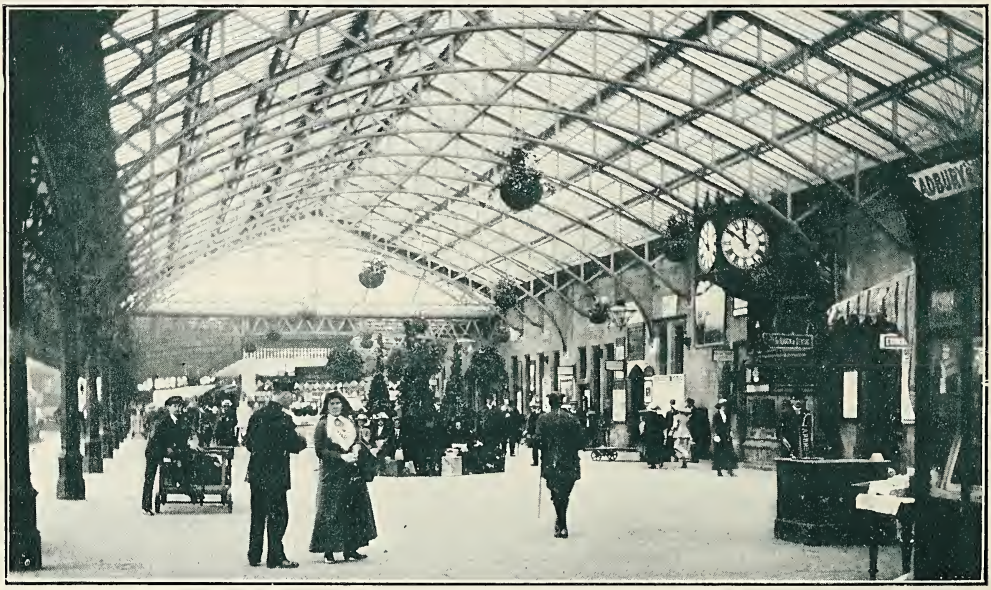
Ideal Studios,] [*Perth.*

WEST COAST (ABERDEEN-EUSTON) LUNCHEON CAR EXPRESS—12.25 P.M. FROM ABERDEEN—ALONGSIDE NO. 4 PLATFORM.

5.5 sees the arrival of the 10.50 p.m. *ex* Inverness with a Highland Railway sleeping carriage for Glasgow (Buchanan Street). This is attached to a Caledonian Railway slow train leaving Perth at 6.0 and timed to reach Glasgow (Buchanan Street) at 8.32.

Excepting the last mentioned, all the foregoing trains run daily, except Monday mornings, and on that day a somewhat different table of working, consequent on the Sunday night departures from the South, falls to be recorded. On Sunday night the through West Coast coaches for the Highland line are conveyed on the ordinary 8.0 p.m. from Euston (2.5 a.m. *ex* Carlisle). The East Coast Railways also run the through carriage by their route on the corresponding 8.15 p.m. *ex* King's Cross, which leaves Edinburgh (Waverley) at 4.4 a.m. (Mondays only) and arrives in Perth at 5.12. The 5.12 Highland Railway train is accordingly detained fifteen minutes awaiting them, but Inverness is reached at 9.8 as on other mornings—at least, nominally so.

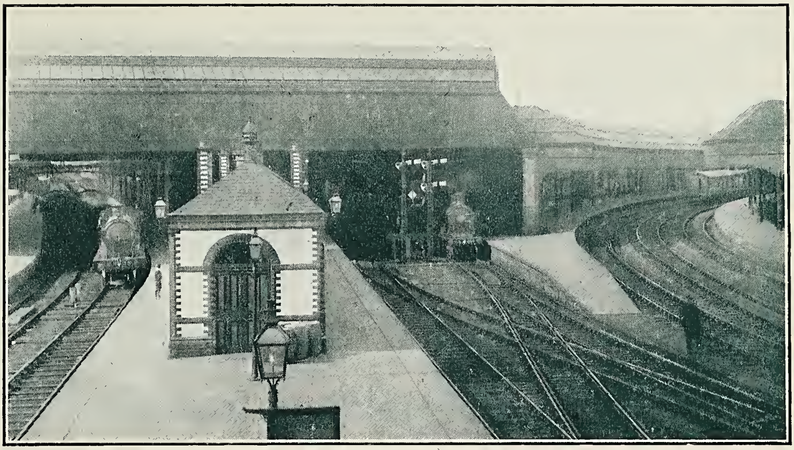
To revert to the West Coast 8.0 p.m. This is one of the most famous Anglo-Scottish Expresses through its association with the races to Aberdeen in " days gone by," and is due in Perth at 5.20 a.m. Always a heavy train, it runs forward to Aberdeen, where it is due to arrive at 7.15 after a call at Stonehaven for ticket-collecting purposes. It may be mentioned here that when the 4.50 a.m. Conditional train from Perth does not run, the through vehicles off the 1.15 a.m. from Carlisle (including the Liverpool to Aberdeen sleeping saloon) are conveyed north by the first portion of the 8.0 p.m. *ex* Euston. The second portion of the 8.0 p.m. is booked to leave Carlisle at 2.22 a.m. and arrive at Perth at 5.28, with an intermediate stop at Stirling to detach the Oban portion. It leaves Perth again at 5.34 and reaches Aberdeen at 7.28, after two booked stops and two extra conditional calls *en route*. A third portion of the 8.0 p.m. is allowed for in the conditional 2.37 a.m. from Carlisle, due in Perth at 5.43.



Ideal Studios,] *[Perth.*

CIRCULATING AREA ON NO. 7 PLATFORM, LOOKING TOWARDS BAY LINES 8 AND 9.

At 5.53 arrives one of the most interesting trains of the day—namely, the 2.54 from Carlisle—the Down Postal, 8.30 p.m. *ex* Euston. This train is combined with the 4.20 a.m. express from Glasgow (Central) at Stirling, though if from any reason the latter train should fail to reach Stirling first, the Postal train does not await its arrival. Leaving Perth at 5.58, it makes the only non-stop run of the day to Aberdeen, 89 miles 65 chains, in 97 minutes, with intermediate passing times of practically a mile-a-minute on most of this section of its journey. Mails for Dundee are sent down from Perth by a semi-fast, which



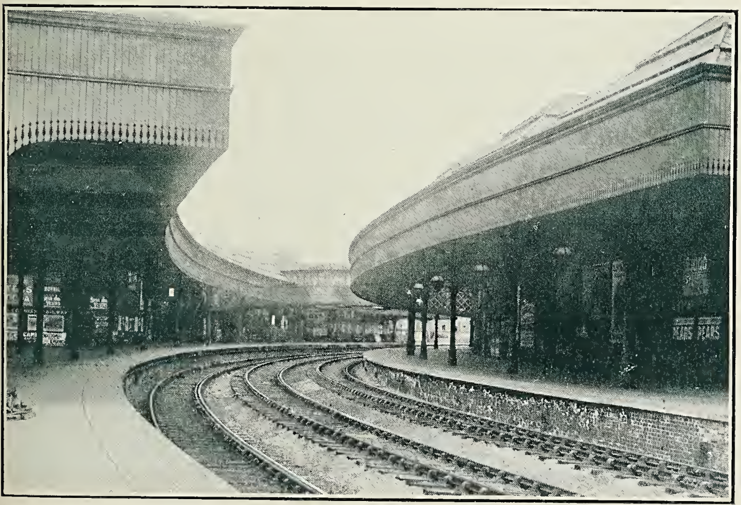
Ideal Studios,] [*Perth.*

VIEW OF PERTH GENERAL STATION FROM SOUTH END.

Caledonian Railway train at Platform No. 3 (left), Highland Railway engine placing through coaches to North British Railway at Platform No. 5.

leaves at 6.10 from the Up main platform, to facilitate their transfer from the Postal train. This, along with one of the Sunday trains, form the exception to the ordinary Dundee departures already referred to. The mails for the Highland line are conveyed north by the 6.15 a.m. to Inverness, *via* Carr Bridge (arrive 9.35 a.m.), on which train the Highland Railway Post-Office sorting vans are run.

The early morning rush over, little transpires until 8.35 when the North British Railway's East Coast Day Express departs with through coaches, which are attached at Edinburgh to the 10.15 from Waverley to the South, due in London (King's Cross) at 6.25 p.m. At 8.35 also the 9.0 p.m. from London (Euston), (4.30 a.m. *ex* Carlisle) arrives. This is a semi-express and terminates at Perth. Not far behind it comes the 11.45 p.m. from Euston (5.43 a.m. *ex* Carlisle), timed in at 9.3, and bringing with it sleeping saloons for Dundee and Aberdeen. It, in turn, awaits the coming of the 7.30 a.m. Breakfast Car Express from Glasgow (Buchanan Street) which, if running to time, it will have passed at Dunblane. In this case the Glasgow train is due at Perth south ticket platform at 9.7, where the Dundee and Aberdeen portions are separated, to run into their respective platforms at the General Station. The Aberdeen portion, after attaching the English coaches, leaves at 9.25 and reaches its destination at 11.50. The sleeping car for Dundee, meanwhile, is attached to the other portion, and



Ideal Studios,] [*Perth.*

THE DUNDEE PLATFORMS (NOS. 1 AND 2) FROM SOUTH END.

Ideal Studios,] *[Perth.*

CORRIDOR FROM NO. 3 PLATFORM TO NO. 2 PLATFORM.
One of the finest railway platform approaches in the Kingdom.

leaves at 9.20, arriving in 'Juteopolis' 32 minutes later. It occasionally happens that the south train is running too late to connect with the Glasgow - Dundee train, in which event the sleeping car is run down "special" from Perth at 9.40 and reaches Dundee (West), 21⅛ miles distant, at 10.15.

Meanwhile the first of the South - going Caledonian Railway expresses falls to be dealt with. This is the 6.45 a.m. from Aberdeen, which is due in Perth at 8.51. The connecting train leaves Dundee (West) at 8.10 and brings a through carriage for London (Euston). This latter is attached to the English portion of the Aberdeen train which leaves Perth at 9.5 and reaches Carlisle at 12.51 and London (Euston) at 7.10 p.m. The second portion, consisting of the vehicles for Glasgow, follows at 9.12 and is due to reach Buchanan Street Station at 10.50. Through carriages from Aberdeen to Edinburgh (Princes Street) are detached at Larbert and reach the capital at 11.7.

Previous to these trains, however, two trains are despatched to Glasgow (Buchanan Street) at 7.20 a.m. with connection from Dundee at 6.25 a.m. and Forfar at 6.0 a.m., reaching Buchanan Street at 9.12 a.m. and at 7.46 a.m., reaching Buchanan Street at 9.45 a.m. The latter connects at Gleneagles with the popular Strathearn Residential Express from St. Fidans and Crieff. Both of these trains provide an excellent morning service to Glasgow and the latter also to Edinburgh, reaching there 9.55 a.m.

8.55, meanwhile, has seen the arrival of the North British Railway express, which leaves Edinburgh (Waverley) at 7.30, with an East Coast breakfast car and through carriages for Perth, received off the 11.30 p.m. *ex* King's Cross and the 9.30 p.m. *ex* St. Pancras. This train gives a capital connection with the Highland Railway's 9.30 to Inverness, which reaches the Highland capital at 1.50 p.m.—a convenient hour for most people.

Nothing much of interest then falls to be recorded till after eleven o'clock, when preparations for the

Ideal Studios,] NOS. 3 AND 4 PLATFORMS, LOOKING NORTH. *[Perth.*

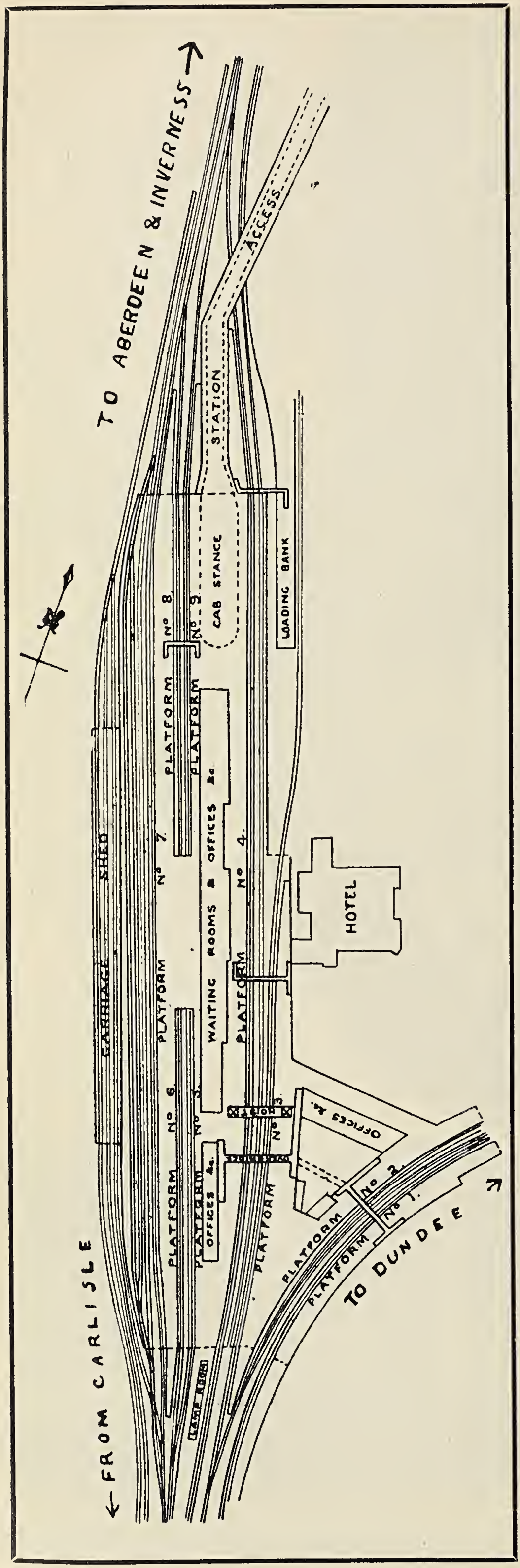
mid-day rush begin. First to appear on the scene is the Caledonian Railway's 9.25 *ex* Edinburgh (Princes Street) "Grampian Corridor," due at 11.17, which awaits here the 10 o'clock Glasgow train, non-stop from Buchanan Street, timed to arrive five minutes later. The latter brings through carriages for Inverness both *via* Carr Bridge and *via* Forres. These are, of course, detached at Perth, and dealt with as we shall see presently. The Edinburgh and Glasgow portions combine, attach a luncheon car, and leave for Aberdeen at 11.37 (arrive 1.51 p.m.). A through coach from Edinburgh (Princes Street) to Blairgowrie is attached on the rear and slipped at Coupar Angus.

Meanwhile the North British Railway's Highland Express—10.10 a.m., *ex* Edinburgh (Waverley)—has come in at 11.26 with the through coaches for Inverness from the Scottish capital; also for Elgin *via* Forres. These, with the Glasgow quota, are attached to the 11.50 and 12.0 noon Highland trains. The former runs by the old line *via* Forres and arrives in Inverness at 4.25 p.m. It is noteworthy inasmuch that it has the longest booked start-to-stop run on the Highland Railway, viz. from Perth to Newtonmore, 68¾ miles, which is accomplished in 114 minutes—no mean performance when one takes into consideration the nature of the road. On Tuesdays this train gives a direct connection at Aviemore to Strathpeffer, at which place the special "Spa Express" arrives at 4.15 p.m., instead of the customary 6.10 *via* Inverness Station. On Wednesdays and Fridays, too, the 11.50 from Perth connects with the "Further North" Express which leaves Inverness at 4.35 p.m. and arrives at Thurso and Wick at 9.5 p.m. The 12.0 from Perth is a slower train and reaches Inverness at 4.36 p.m. *via* Carr Bridge.

Ideal Studios,] MR. JOB HARDMAN, [*Perth.*
Station Superintendent.

One more northward bound train and we must devote our attention to those proceeding South from Perth during the time we have been occupied in dealing with the foregoing. This is the Dundee portion of the 10.0 a.m. from Glasgow, which during the summer months departs from Buchanan Street at 10.10 and, with four intermediate stops, is due in Perth at 11.55. It runs direct to the "Dundee Platform" and, leaving seven minutes later, reaches Dundee in the even half-hour.

Passing over the two Highland Railway trains due in from Inverness at 11.30 a.m. and 11.56 a.m. respectively, we have first to note the 11.30 a.m. Dundee (West) to Glasgow Mid-day Express which arrives at 12.2 p.m., after shunting back into the Down main platform. It leaves at 12.10, always well filled, and is due to arrive in Buchanan Street Station at 1.52. Meanwhile the Up main platform is kept clear for the arrival at 12.10 of the 10.5 a.m, *ex* Aberdeen. This is the Up West Coast Mid-day Express, due in London (Euston)



PLAN OF PERTH GENERAL STATION.

at 10.45 p.m. The departure time from Perth is 12.25, and it combines at Symington with the 2.0 p.m. from Edinburgh (Princes Street) to the South, except during September, when it is run separately to Carlisle. A relief to it for local passengers follows from Perth at 12.35 and reaches Carlisle at 5.5. This train takes forward to Larbert through carriages for Edinburgh (Princes Street) received off the 10.5 from Aberdeen.

Prior to this, the North British Railway Express for Edinburgh departs at 12.30 with through carriages (including the East Coast luncheon car which came down as a breakfast car on the 7.30 a.m. *ex* Waverley) for London (King's Cross and St. Pancras). This train reaches the Waverley Station at 1.45, and the East Coast coaches are transferred to the 2.20 p.m. to the South, due in King's Cross at 10.45. Those for the Midland Railway are attached to the 2.20 for Carlisle, due in St. Pancras at 11.15 p.m. The local North British Railway coaches of the 12.30 from Perth run through as a relief to the latter train at 2.35 from Edinburgh, and reach Carlisle at 5.38.

The Caledonian Railway now claims our attention again with the arrival at 12.50 of the 10.35 a.m. *ex* Aberdeen "Grampian Corridor." This train has an extra call at Fordoun on Saturdays, and is four minutes later in arriving at Perth on that day in consequence. A luncheon car is attached and the General Station is left again at 1.0. Glasgow (Buchanan Street) is reached at 2.35, after calling only at Stirling and Larbert, where this train is combined with the 9.45 a.m. from Oban.

Another interval of comparative quietness, broken only by the coming and going of uninteresting though perhaps not unimportant local trains, ensues for the next two hours. Shortly after three o'clock, however, the Station again assumes a busy aspect—indeed, it is surprising to witness the transformation which a few minutes will bring about. The first train of note to appear on the scene is the 11.5 a.m. *ex* Inverness *via* Carr Bridge which comes in at 3.10, bringing with it through carriages for Glasgow (Buchanan Street) and Edinburgh (Waverley). On Mondays, Wednesdays and Fridays this train also has a through carriage from Strathpeffer to Perth, which is returned north by the 9.30 a.m. next day. The Highland Railway train is scarcely disposed of, ere the Caledonian Railway 12.50 p.m. Aberdeen-Glasgow Express due at 3.16 (3.18 on Mondays) draws up alongside the main Up platform. It attaches the through coaches from Inverness, and leaves at 3.25. Buchanan Street Station is reached at 5.0, after only one stop at Larbert to detach a portion for Edinburgh (Princes Street) from Aberdeen, which arrives in the Scottish capital at 5.25.

In the opposite direction the 1.25 p.m. from Edinburgh (Princes Street) arrives at Perth at 3.17, here to await the 2 o'clock from Glasgow. The latter train, another non-stop one from Buchanan Street, is one of the heaviest Caledonian Railway expresses of the day. In addition to an ample load of ' Grampian ' stock, it also conveys through carriages for the Highland and Great North of Scotland Railways, sometimes half a dozen in number. The vehicles for the former line are, of course, detached at Perth and transferred to the 3.50 for Inverness, which also takes forward through coaches from Edinburgh, brought by the 2.5 North British Railway express *ex* Waverley, due in Perth at 3.20. The Caledonian train leaves at 3.35 and reaches Aberdeen at 6.0, after a number of intermediate stops.

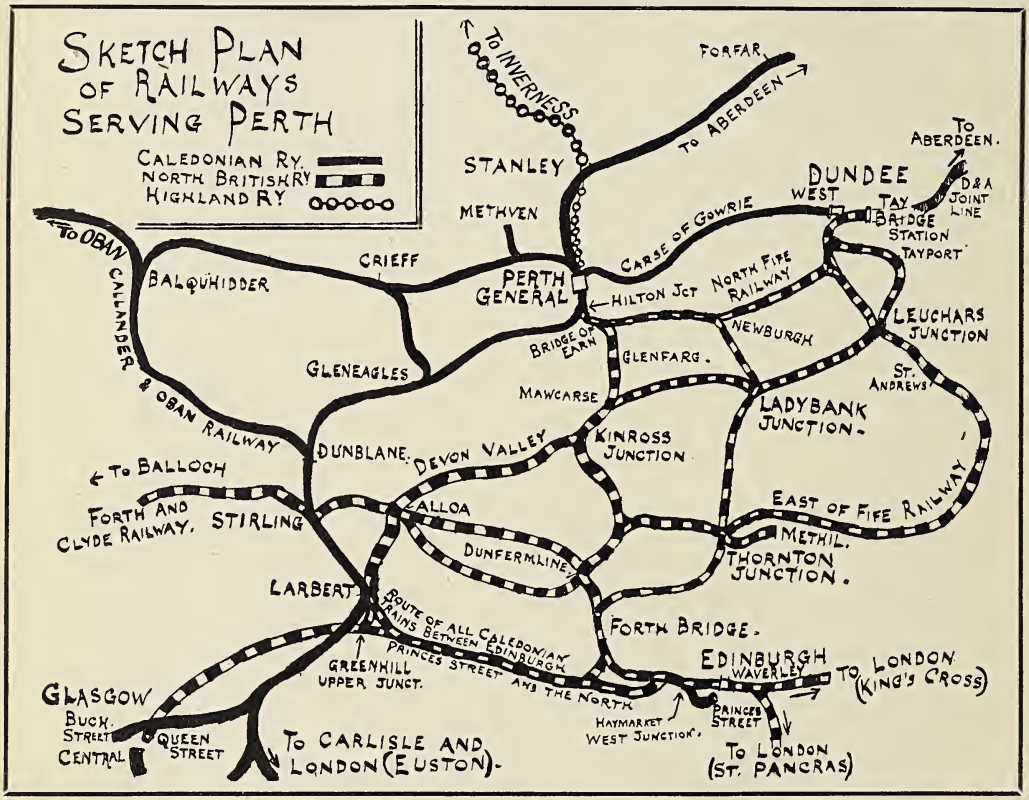
The 3.50 Highland Railway train runs to Inverness both *via* Carr Bridge and *via* Forres; the two portions dividing at Aviemore. Through carriages are run from Glasgow by both routes, arriving in Inverness at 7.42 and 9.15 respectively; also to Elgin *via* Forres, which is reached at 8.48. A second Highland train follows from Perth at 4.10 and arrives in Inverness at 8.40 *via* Carr Bridge.

To revert again to the Caledonian Railway: 3.46 sees the arrival of the Up Limited Mail (1.10 *ex* Aberdeen.) This train divides at Perth into two portions. The first leaves at 3.55 for Glasgow and is due in Buchanan Street at 5.35. The second occupies the Up main platform until 4.7, when it leaves on its journey South. The reason for this is that the 3.30 Dundee (West) to Glasgow train, which arrives in Perth at 4.0, runs combined with it as far as Larbert. The Dundee portion thence runs into Buchanan Street, where it arrives at 5.55 and the Aberdeen train continues its journey South, being due in Carlisle at 8.33 p.m., and Euston at 3.50 a.m. next day.

We have next to turn our attention to the 2.7 *ex* Glasgow (Buchanan Street), which follows as a relief to the over-taxed 2 o'clock, and is due to arrive at the Dundee Platform at 3.53. It departs at 4.0 and reaches Dundee (West) at 4.35, forming a convenient and popular train between the two cities. Prior to this a North British Railway express has left for Edinburgh at 3.50, taking forward the through coaches from Inverness brought by the 11.5 a.m. and timed to reach Waverley Station at 5.9. Another similar express follows at 4.10 and reaches Edinburgh at 5.33 in time to connect with the 6.0 train to Carlisle and London (St.Pancras).

The present busy rush concludes at this period with an interesting arrival out of the ordinary course of things. This is the Up West Coast Express Fish Train, due in Perth at 4.5 daily except Saturdays. This train is booked to leave Aberdeen at 2.0 p.m. and runs all the year round. It stops only at Forfar, except when required to pick up traffic at Stonehaven and Dubton Junction (from Montrose) for England; 39 minutes are allowed for the 32½ miles from Forfar to Perth, and a quarter of an hour is occupied in the General Station attaching waggons received off the Highland Railway, etc. Perth is left punctually at 4.20 and Carlisle reached at 8.15, where the London and North-Western Railway takes charge of the fish special and ultimately brings it into Broad Street Station, London, about 3.30 next morning, in good time for the early Billingsgate Market. The importance of this train may be gauged from the fact that it is often run in duplicate during the height of the fishing season. When this is done the first portion does not attach or detach on the journey and runs from Perth (North) to Perth (South) *via* the Goods Lines, avoiding the General Station. It calls at Perth (South) for Locomotive purposes only and follows thence the 4.7 Limited Mail to the South. The second portion from Aberdeen follows behind, making the ordinary booked and conditional stops.

A lull now ensues in the General Station until 5.35, when, punctual to the minute, probably the most interesting South-going train of the day draws alongside the Up Main Platform. This is the 3.40 Postal Train from Aberdeen, the corresponding train to the 5.58 a.m. from Perth to the North, and has a passenger portion for Glasgow (Buchanan Street), restricted to "3 vehicles" (*i.e.* two 'Grampian' bogie coaches) marshalled at the rear. Accommodation is accordingly strictly limited and heavy luggage and bicycles are not conveyed. Forfar is the only stop between Aberdeen and Perth and the run from Forfar to Perth a distance of 32½ miles is performed in 34 minutes. It resumes from Perth its strenuous journey Southwards at 5.45 after the arrival at 5.39 of the connecting train, 5.0 from Dundee (West), At Stirling the passenger portion is detached and the train runs South thereafter for postal purposes only; reaching Carlisle at 9.14 and Euston at 4.16 next morning, or only 26 minutes after the 1.10 "Limited Mail" from Aberdeen. The passenger vehicles go forward from



Stirling at 6.33 combined with the 3.0 from Oban and are due in Glasgow at 7.23, but in times of pressure passenger coaches from Aberdeen are often run independently of the Postal Train from Perth.

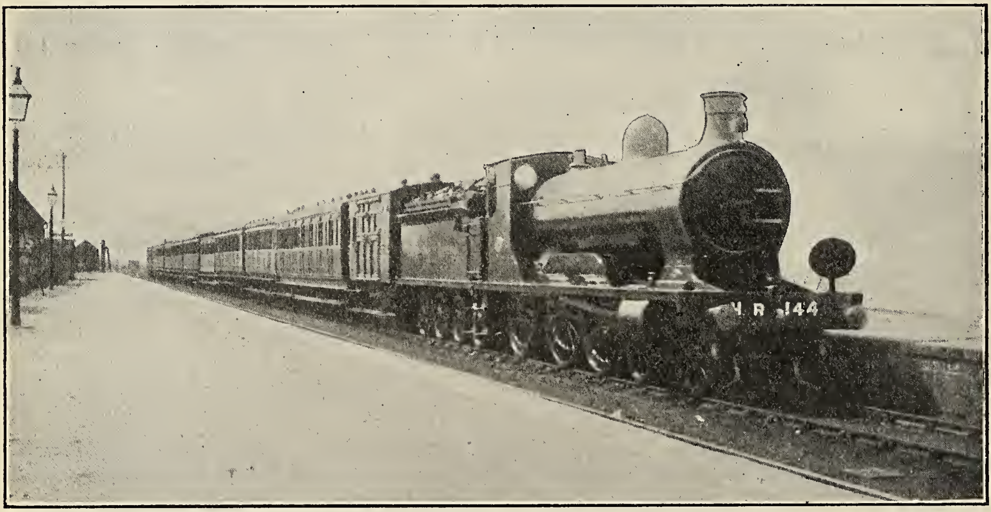
During the time occupied in dealing with the Postal Train, the Down Main platform has received a semi-fast in the shape of the 1.2 p.m. *ex* Carlisle, connecting with the 5.0 a.m. *ex* Euston, due at 5.40, which terminates here. Passing over a conditional Fish Train, 3.47 *ex* Aberdeen, due at 6.0, little of importance transpires until 6.30, when a Highland Railway slow train, which leaves Grantown at 2.10 comes in, and marks the commencement of the evening busy period. 6.37 should see the arrival of the 4.25 from Edinburgh (Princes Street) to await the 5.0 " Granite City " Tea Car Express from Glasgow (Buchanan Street) due at 6.50. This latter train calls at Perth South Ticket Platform, where the Dundee portion is detached and run direct to the Dundee Platform. The Dundee train leaves Perth at 7.0 and arrives in ' Juteopolis ' thirty-two minutes later. The Tea Car on the Aberdeen portion is detached at Perth, the train then runs forward at 7.0 and arrives in the Granite City at 9.15. Incidentally, passengers from Edinburgh can, daily, except Saturdays, leave Princes Street Station so late as 4.50 and join the 5.0 from Glasgow at Dunblane. The corresponding North British Railway train, is the 4.25 *ex* Waverley, which reaches Aberdeen *via* the Forth and Tay Bridges at 8.48.

At 7.6 the 2.30 Highland Railway train from Inverness *via* Forres comes in, bringing through carriages for Glasgow (Central) and Edinburgh (Waverley), and is closely followed nine minutes later by the 3.50 Express *via* Carr Bridge, also providing through carriages, but by the direct route.

7.39 heralds the coming of the 5.30 ' Grampian Corridor ' from Aberdeen, with Dining Car vestibuled throughout. It attaches through carriages off the 7.0 *ex* Dundee (West) which has come in at 7.32, also the vehicles from the Highland Railway, and leaves at 7.47 on a non-stop run to Glasgow, reaching the Central Station at 9.28. This train is one of the most popular Caledonian Railway expresses of the day, and formerly shared the honour with the 10.5 a.m. *ex* Aberdeen of having the fastest booked start-to-stop run on that Company's system, viz. from Forfar to Perth, 32½ miles, in 32 minutes. Also, like so many others, this record has " gone by the board " and 34 minutes is now allowed for this section of the journey. A relief train follows south from Perth at 7.51, composed of through carriages from Aberdeen to Edinburgh transferred from the 5.30, and local carriages for Glasgow (Buchanan Street). The latter station is reached at 10.2, and the Scottish capital at 10.4. 7.52 sees the arrival of the 6.35 North British Railway Express from Edinburgh (Waverley), with through carriages for Perth received off the 9.30 a.m. *ex* St. Pancras and the 10.0 a.m *ex* King's Cross, and three minutes later the Up East Coast night express departs with Sleeping Cars for London (King's Cross arrive 7.0 a.m.) and the Inverness-Edinburgh vehicles off the 2.30 and 3.50 Highland trains from the North. At the same time (7.55) the corresponding West Coast train, 5.45 from Aberdeen, is due to arrive. It does not leave again until 8.14 and reaches Carlisle at 12.7 and Euston at 7.50 a.m. It may be mentioned that the 5.45 conveys a very heavy fish traffic for the North of England, Ireland, etc., and is frequently duplicated on this account. A Post-office Sorting Van is run from Aberdeen to Euston, and a Sleeping Saloon is also attached at Perth for Liverpool (Lime Street) during the height of the Tourist Season. A Sleeping Saloon is run all the year round on the train from Aberdeen to Euston.

To avoid confusion we have been dealing up till now principally with Southgoing trains, and it will be necessary at this point to revert to a couple of important arrivals of Caledonian Railway trains from the South. Firstly is the 6.5 Glasgow (Buchanan Street) to Dundee and Aberdeen express which divides at the South Ticket Platform and arrives in the General at 7.43 and 7.46 respectively. It awaits here the 4.29 Express from Carlisle (10.5 a.m. *ex* Euston) due at 8.0 with Dining Car attached, also a through carriage from Liverpool (Lime Street) to Perth and one from London to Dundee. The Aberdeen portions combine and leave at 8.9, reaching the Granite City at 10.20. The Dundee train leaves at 8.15 and arrives in Dundee (West) at 8.55. By the 10.5 a.m. train from Euston magnificent new carriages with all the latest improvements are now being run to Dundee and Aberdeen, returning on the up journey at 8.10 a.m. and 6.45 a.m. respectively.

At 9.5 with the arrival of the 5.0 Highland Railway express from Inverness, preparations for the final rush of traffic are in full swing. This train brings through carriages and sleeping saloons for all three of the Anglo-Scottish routes, except during September, when only the East Coast and Midland Railway vehicles are conveyed by it. The vehicles for the latter two routes are attached to the 9.30 North British Railway express from Perth to Edinburgh which reaches Waverley after a non-stop run at 10.41 ; and ultimately arrive in King's Cross and St. Pancras at 7.35 and 8.15 a.m. (8.30 a.m. on Sundays) respectively. The West Coast vehicles leave on a Caledonian Railway express for Carlisle at 9.40, reaching the Border City at 1.10 a.m. and London (Euston) at 7.45 a.m. (five minutes before the 8.14 p.m. from Perth). Only one stop is made between Perth and Carlisle (150¾ miles), viz. at Stirling to take forward vehicles off 6.45 p.m. *ex* Oban.



Photo] [*Mr. Tom M. L. Neish.*

THE 11.50 A.M. HIGHLAND RAILWAY EXPRESS FROM PERTH NON-STOP TO NEWTONMORE, 69 MILES—THE LONGEST NON-STOP RUN ON THE HIGHLAND RAILWAY.
Locomotive No. 144, *Blair Castle*, carrying "Engine following" board.

In September, however, the West Coast Train is run "Special" down the Highland Railway, leaving Inverness at 5.15 p.m. and reaching Perth at 9.20. The Caledonian Railway train to the South runs ten minutes later in consequence of this.

The 9.15 from Dundee (West) comes in at 9.56 with a composite sleeping car and third class carriage for London, which is attached to the 7.55 *ex* Aberdeen West Coast night express due in Perth at 10.2, and leaving ten minutes later for the South. This train, the last of the English trains for the night, reaches Carlisle at 1.43 a.m. and Euston at 8.5 a.m. A Glasgow portion follows from

Perth at 10.20, composed of through vehicles from Aberdeen, and is due in the Central Station at 12.31 a.m.

A North British Railway express, 9.5 from Edinburgh (Waverley), comes in at 10.37 with through coaches for Perth off the 11.20 a.m. *ex* King's Cross *via* Harrogate. This train is not due until 10.47 on Saturdays, owing to extra stops at Kelty and Kinross.

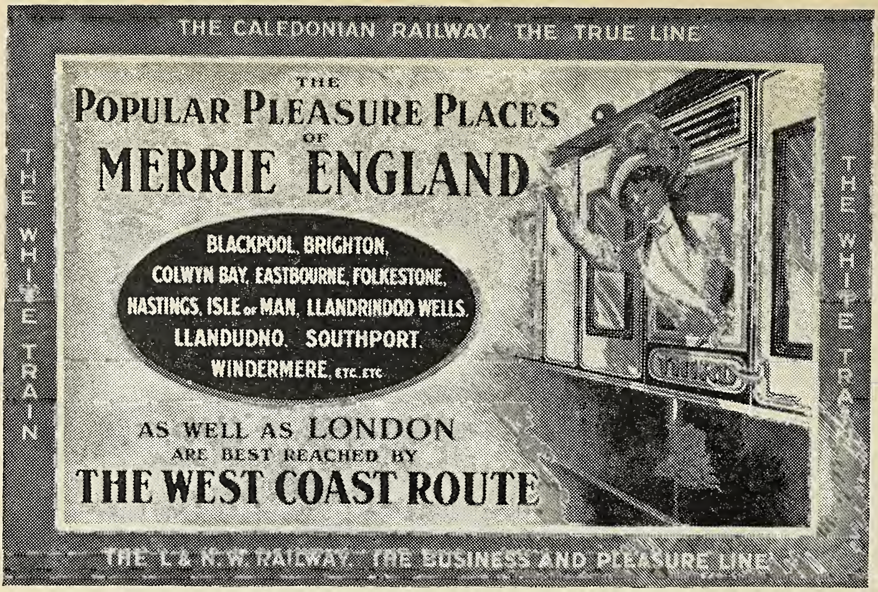
At 12.12 a.m. the last of the North-going Caledonian Railway trains arrives. This is the 10.0 p.m. from Glasgow (Buchanan Street) with a Highland sleeping saloon for Inverness and also a through carriage for Aberdeen received off the 9.45 p.m. train *ex* Edinburgh (Princes Street) at Stirling. A Dundee portion is detached at the South ticket platform and runs direct to the Dundee platform from there, but, like the Aberdeen train, it awaits the arrival of the Mail-Express Passenger, 8.48 p.m. from Carlisle (2.0 p.m. *ex* Euston), due at 12.35. Both trains then leave Perth at 12.50 and reach Dundee and Aberdeen at 1.20 and 3.20 a.m. respectively, the Aberdeen train taking forward a through carriage, or carriages, from London (Euston) off the 2.0 p.m.

There now remains only the 12.55 a.m. Highland Mail-Passenger to Inverness to deal with. To it is attached the "Sleeper" off the 10.0 p.m. from Glasgow. It arrives at Inverness at 4.56 a.m.—truly a romantic journey in the small hours, especially in winter! As the foregoing trains from the South do not leave on Sunday nights, the corresponding 12.50 trains to Dundee and Aberdeen and the 12.55 to Inverness do not run on Monday mornings. Only now does Perth settle down to a brief spell of uninterrupted quietness until 4.20 a.m., when the same daily routine is resumed; except that on Monday mornings the rest interval lasts until 5.8.

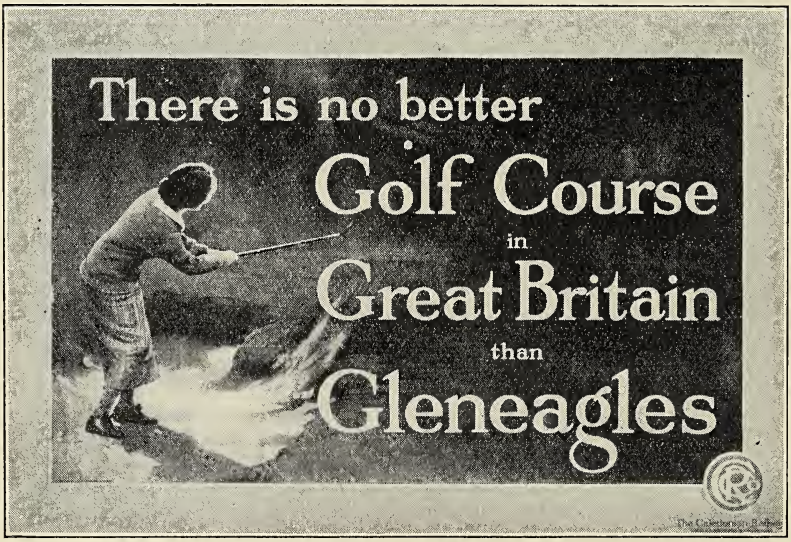
THE STATION HOTEL, PERTH.

Such then is the account of the day's romance at one of Britain's most important railway stations, and to the looker-on, who is interested in the subject the romance of it all is never-ending. Indeed, one can but marvel at the perfect simplicity with which the intricacies of traffic working are evolved and the freedom and ease with which every movement of the trains is carried out. Fascinating as it all unquestionably is, the whole testifies only too plainly to the inborn love for travelling which is one of the characteristics of the average Briton, and also to the extent to which the business and commerce of a mighty nation such as ours is bound up in its railway system.

The writer's thanks are due to Mr. Donald A. Matheson, the General Manager, and Mr. T. W. Pettigrew, the General Superintendent of the Caledonian Railway; to Mr. Hardman, the Perth Station Superintendent, and to others, who have kindly accorded facilities for the preparation and illustrating of this article.


THE CALEDONIAN RAILWAY. THE TRUE LINE
THE POPULAR PLEASURE PLACES OF MERRIE ENGLAND
BLACKPOOL, BRIGHTON, COLWYN BAY, EASTBOURNE, FOLKESTONE, HASTINGS, ISLE OF MAN, LLANDRINDOD WELLS, LLANDUDNO, SOUTHPORT, WINDERMERE, ETC. ETC.
AS WELL AS LONDON ARE BEST REACHED BY THE WEST COAST ROUTE
THE WHITE TRAIN
THE WHITE TRAIN
THE L & N. W. RAILWAY. THE BUSINESS AND PLEASURE LINE

AN INTERESTING WEST COAST POSTER.


There is no better Golf Course in Great Britain than Gleneagles
The Caledonian Railway

CALEDONIAN RAILWAY NEW GOLFING POSTER.

A Railway Record

THE CALEDONIAN RAILWAY Co.

have just placed with us a five years contract for the exclusive supply of Typewriters. This contract for Underwoods constitutes a record order for Typewriters in the British Isles. AUGUST 1910

A Glasgow Suburban Station with 12 Platforms.

TRAVELLERS between the South and Glasgow, by the Caledonian Railway, must have noticed Rutherglen Junction, situate 3 miles from Glasgow Central. Looking out of a main line train on the east side, the station has a very extensive appearance, an appearance increased by two lengthy overbridges for passengers on foot who wish to make their way from or to the various platforms and the public thoroughfares abutting upon the station.

The station is, undoubtedly, a very extensive one, covering a large area ; the plan on page 476 will show why it appears to be even more extensive than it is in reality. There are three sets of platforms, forming the sides of an (approximately) equilateral triangle, of which the base is the main line. Travelling either up or down the main line, one first sees one or the other of the series of branch platforms, then the main line platforms are passed, and, beyond these, the other sets of branch platforms come into view, whilst in the interval the two long footbridges already referred to have also been observed ; consequently, extensive as it is, Rutherglen Junction gives the traveller an impression that it is larger than is actually the case.

Let us see how it comes about that a station of such large dimensions is situate at Rutherglen. It is evident that the normal passenger traffic dealt with at the station cannot require 12 platform faces to accommodate it.

The present station grew in this wise: there was a station at Rutherglen as long ago as 1849, but this disappeared 30 years after.

This original station was situated immediately to the west of Farmloan Road, about where " To Carlisle and Edinburgh " appears on the plan on the next page. This station served the surrounding district by main line trains to and from what was then known as the Glasgow South Side station, which was situated on the south side of the River Clyde, and about a mile due south from the present Central station.

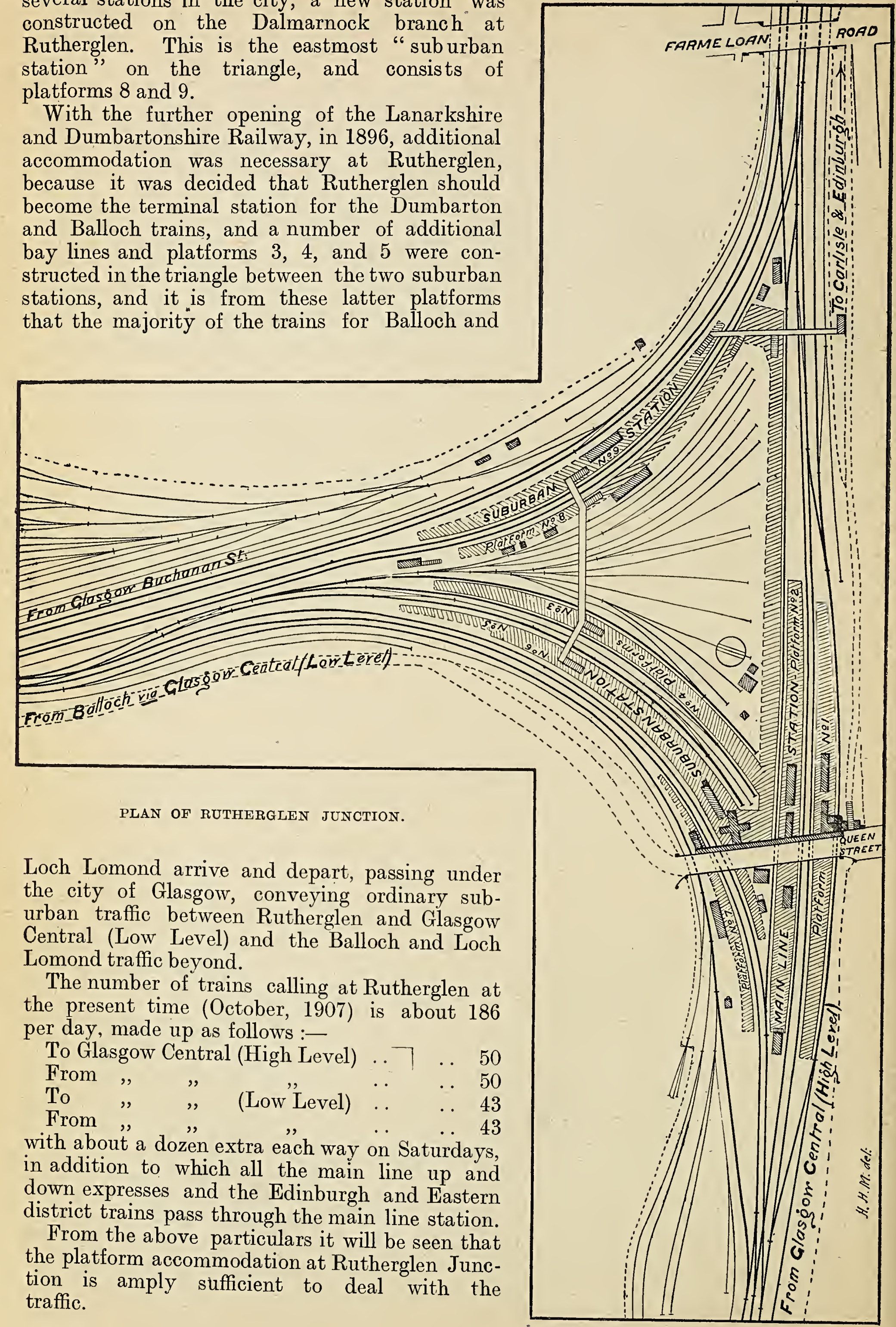
Rutherglen remained a roadside station until 1879, when passenger stations were constructed at Bridgeton and London Road in the east end of Glasgow, and a service of trains was then brought into operation *viâ* the Caledonian Railway's Dalmarnock branch ; and, in order to accommodate these trains, it was necessary to move Rutherglen station to the east of Farmloan Road, so as to place it in front of the junction of the branch railway leading to London Road. The position of the 1879 Rutherglen station is not shown on our plan ; it was situate just beyond the overbridge at the top of the right hand end of the plan.

In the year 1892 a new spur line was constructed, connecting the Dalmarnock branch near the River Clyde with the Caledonian Railway's main line from Carlisle to Glasgow, near Glasgow Road. Platforms (No. 7 and the bottom half of No. 6 on plan) were provided on this spur line at the crossing under Queen Street, and the London Road and Bridgeton trains were diverted to these platforms.

Simultaneously with the opening of this spur line, Rutherglen station on the main line was again moved in a westerly direction to a point at the crossing of Queen Street, to enable passengers to change from and to the main line trains and the local trains. Thus Rutherglen station No. 2 disappeared, and a portion of the present Rutherglen Junction station (platforms 1, 2, 7, and part of 6) came into existence.

With the opening of the Glasgow Central Railway, in 1895, and the inauguration of a new train service between the residential districts lying to the east of Glasgow and the several stations in the city, a new station was constructed on the Dalmarnock branch at Rutherglen. This is the eastmost "suburban station" on the triangle, and consists of platforms 8 and 9.

With the further opening of the Lanarkshire and Dumbartonshire Railway, in 1896, additional accommodation was necessary at Rutherglen, because it was decided that Rutherglen should become the terminal station for the Dumbarton and Balloch trains, and a number of additional bay lines and platforms 3, 4, and 5 were constructed in the triangle between the two suburban stations, and it is from these latter platforms that the majority of the trains for Balloch and Loch Lomond arrive and depart, passing under the city of Glasgow, conveying ordinary suburban traffic between Rutherglen and Glasgow Central (Low Level) and the Balloch and Loch Lomond traffic beyond.



PLAN OF RUTHERGLEN JUNCTION.

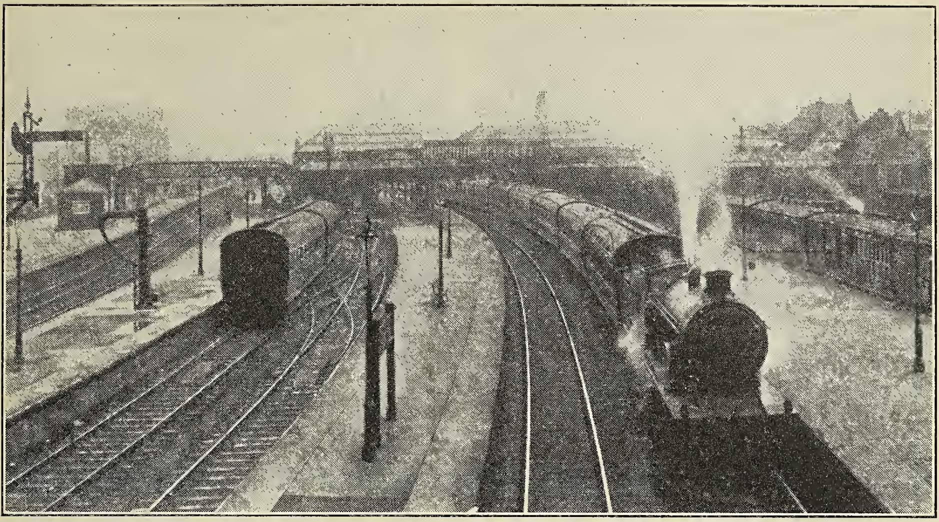
The number of trains calling at Rutherglen at the present time (October, 1907) is about 186 per day, made up as follows:—

To Glasgow Central (High Level)	..	50
From ,, ,, ,,	..	50
To ,, ,, (Low Level)	..	43
From ,, ,, ,,	..	43

with about a dozen extra each way on Saturdays, in addition to which all the main line up and down expresses and the Edinburgh and Eastern district trains pass through the main line station.

From the above particulars it will be seen that the platform accommodation at Rutherglen Junction is amply sufficient to deal with the traffic.

Jan: 1927



GENERAL VIEW OF STATION.

Stirling as a Tourist and Traffic Centre.

By J. F. GAIRNS, M.Inst.T., M.I.Loco.E.

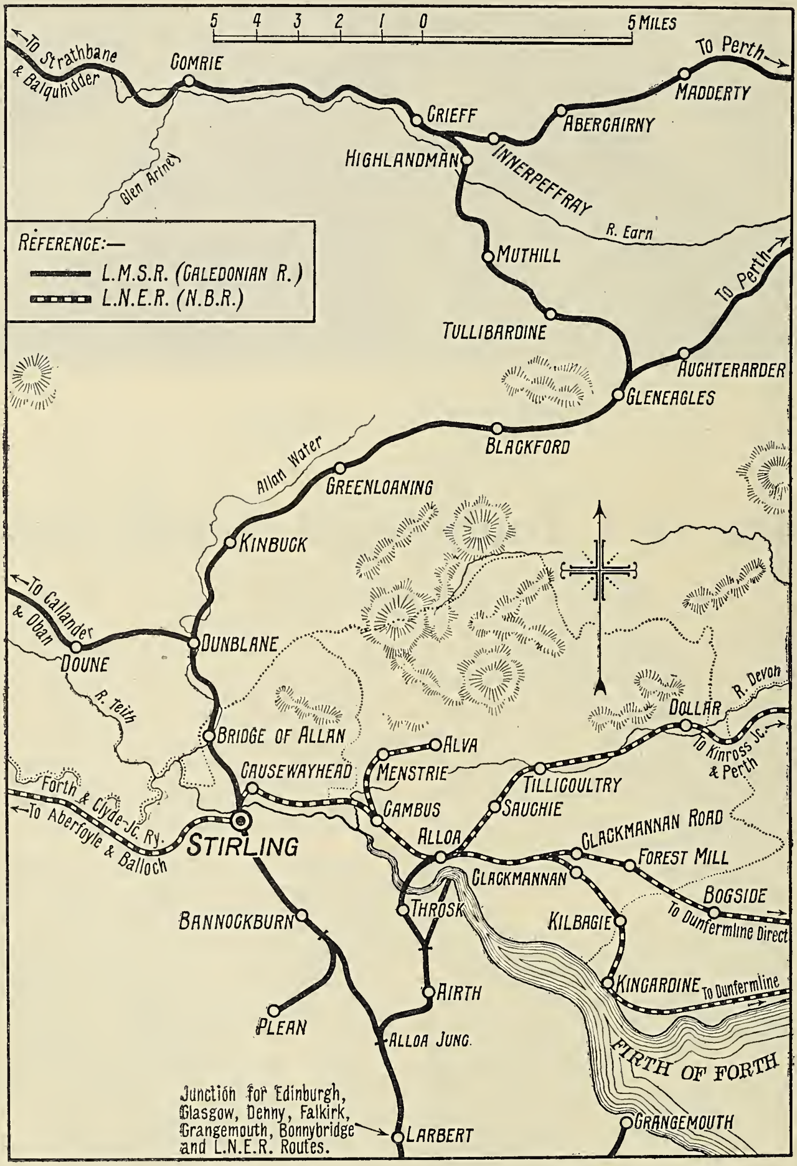
THERE are few places, even in Scotland—the land of history and romance—which have so much to offer as does the "Ancient and Royal" Burgh of Stirling, once the home of Scottish kings, and its old Parliament House the centre of legislation. As the Official Guide issued by the Stirling Town Council effectively summarises one phase:—

> Here have been enacted some of the most thrilling episodes in the drama of these islands; here have walked and talked and fought many of the most romantic figures in the history of the British people. Stirling for centuries was the home of Scottish Kings; in troublous times legislation was centred in its old Parliament House; within its ancient church, Knox, that impassioned iconoclast, lashed with fiery denunciation the shortcomings of the Roman church, and the same old fane was once mute witness to the baptism of a babe whose head was destined to bear the Crown of England.

And again:—

> Round the rock on which the Castle's battlements still keep silent watch and ward, English pikes have often glittered in past days, and up its steep sides the flower of English chivalry has more than once stormed in victorious assault. Beneath its ramparts, in dead of night, intrepid clansmen have gathered mysteriously with hushed voices, bent on desperate enterprise, and suddenly swarming over the grey old walls with fearsome slogan and fierce blows, have put its southern defenders to the sword. From these same old walls we may stand and view Stirling Bridge, where Wallace hurled back the attack of Surrey and Cressingham, and see, too, the field of Bannockburn, where the Bruce smashed into utter defeat the huge forces of the proud Edward.

Moreover, "Stirling's appeal is not ended when its castle and church and Parliament House have been seen; the whole district teems with beauty and tales of derring-do," while as a tourist centre there are few places so conveniently located, so pleasantly situated, and so suitable for radiating tours of widely varying interest. Further, while these aspects will, no doubt, appeal to readers of THE RAILWAY MAGAZINE, who in such matters are on the same footing as the general body of tourists and holiday makers, Stirling station is the centre of a great deal of distinctly interesting traffic working, and while paying due tribute to the historic and scenic attractions of Stirling and district, we can quite imagine that many will desire, if they have not done so already, to spend some time at the station during a busy period and to "taste" some of the good things which the railways concerned have to offer in the way of touring and excursion facilities. There is much to be said, indeed, for arranging a touring itinerary, such as those provided by the many and varied tourist tickets, round tours, &c., available for passengers from England and from Scottish centres from May to October. Many of these include Stirling as a "break of journey" station, place it on an alternative route, or bring the traveller sufficiently near to justify a local trip, either by ordinary or excursion train, to this famous old city.



MAP OF RAILWAY ROUTES TO AND FROM STIRLING.

The fact that Stirling is on the main L.M.S. route from Glasgow, Edinburgh and the south to Perth, Aberdeen and the Highland line, while it frequently constitutes the junction station (the actual junction is Dunblane) for the Callander and Oban line, gives it the benefit of main-line train services and of through carriage facilities on a generous basis. Further, these facilities are realised to the full, in that there are very few expresses which do not call at Stirling, and most of these are included in one or other of the interesting groups of trains which characterise the services on this section, so that if one train does not call at Stirling there is another associated with it which does. Moreover, while the station is the property of, and is staffed by, the London, Midland and Scottish Railway, it accommodates a by no means unimportant proportion of London and North Eastern trains on routes which possess considerable interest, and the traffic connections are well worthy of study.

All L.M.S. trains enter Stirling Station at the south end, from the Larbert direction, whether from Carlisle and England, from Glasgow (Buchanan Street or Central) or from Edinburgh (Princes Street). The latter trains exercise running powers over the L.N.E.R., from the Haymarket Junctions (Edinburgh), through Falkirk (Grahamston), until L.M.S. metals are reached south of Larbert. The principal L.N.E. trains from Edinburgh, which travel via the Forth Bridge, Dunfermline and Alloa, enter Stirling Station at the north end, though L.N.E.R. trains from Glasgow (Queen Street), from Edinburgh (Waverley) via Falkirk (Grahamston), and locals from Grangemouth and Falkirk use the L.M.S. route via Larbert.

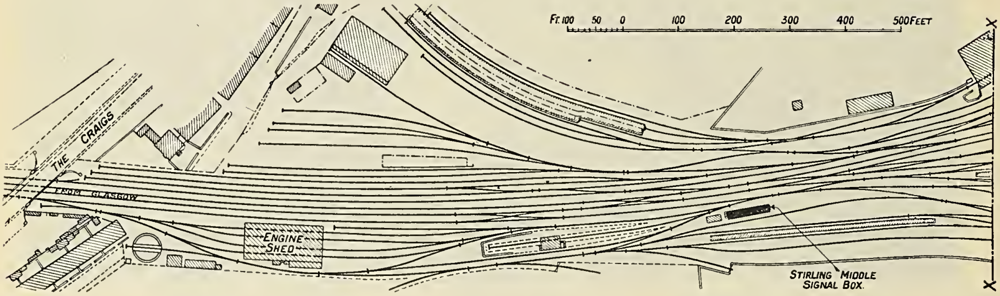
North of Stirling L.M.S. trains continue to Perth, Aberdeen, Dundee, Inverness and the Highland line, the Callander and Oban line via Dunblane, or to Crieff, Comrie, St. Fillans and Balquhidder via Gleneagles. L.N.E.R. trains diverge to Alloa on one side, and thence to Kinross Junction, Perth, Ladybank, etc., or to Dunfermline (direct or via Kincardine), Edinburgh, etc., or on the other side to the Forth and Clyde line, to Aberfoyle, Balloch, etc.

THE OLD BRIDGE AT STIRLING.

It will therefore be seen that Edinburgh services are given generally from the north in the case of the L.N.E.R., though L.N.E.R. Glasgow trains use L.M.S. lines between Larbert and Stirling, while L.M.S. main line services all use the Larbert-Stirling section, whether they come from Edinburgh or Glasgow or from Carlisle and England. Stirling station is therefore important not only on its own account but also as a centre for interconnecting trains.

Stirling first obtained railway facilities in 1848, when the old Scottish Central line was opened from the Caledonian at Gartsherrie via Greenhill to Larbert, Stirling and Perth, there connecting with the Scottish North Eastern, which completed the route to Aberdeen. The Scottish Central Railway, by the way, was also built to connect with the Edinburgh and Glasgow Railway (later N.B.R.) at Falkirk, as well as with the Caledonian, a fact which explains why L.M.S. trains utilise part of the L.N.E.R. to provide the L.M.S. Edinburgh–Larbert and Stirling connections.

The Forth and Clyde Junction Railway was incorporated in 1853 and opened in May, 1856. Working arrangements gave place to a 50 years' lease to the North British Company in 1875, but this company is now included in the L.N.E.R. system under the Railways Act of 1921, so that the question of renewal of lease has not arisen. The Forth and Clyde was, however, operated as a separate concern, though by North British engines, vehicles and staff, maintaining its own accounting and issuing its own annual reports. The Stirling–Alloa line was constructed by the Stirling and Dunfermline Railway Company in 1850–52 and taken over by the North British Railway in 1862.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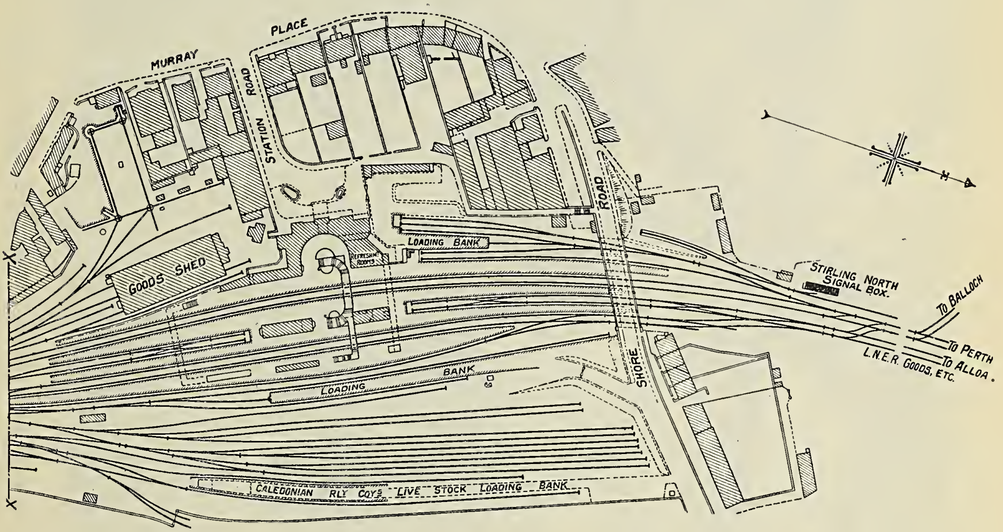
THE CRAIGS
FROM GLASGOW
ENGINE SHED
STIRLING MIDDLE SIGNAL BOX.

PLAN OF PASSENGER STATION,

The modern station at Stirling is regarded as one of the outstanding works of its kind on the late Caledonian system. It was completed in 1915, replacing a structure and lay-out which had become seriously inadequate. It is characterised, first, by the station buildings, which are designed on unusually neat and appropriate lines; secondly, by the layout and constructional features of the booking-hall, with the adjacent refreshment, dining and waiting rooms, and the parcels and staff offices; thirdly, by the covered and open footbridges which give connection with other platforms; and, fourthly, by the neat and effective design of platforms, shelters and premises generally. It is, in fact, one of several Caledonian stations which are notable in respect of the attention to æsthetic aspects in carrying out constructional work, and the adaptability of floral decorations in conjunction therewith.

The station is reached from King Street, one of the main thoroughfares in Stirling, via Murray Place and the Arcade, with a footpath approach from Shore Road Bridge which crosses the railway at the north end of the station. The grey-stone castellated design of the frontage, with its three gables, harmonises with the building characteristics of the town. There is a spacious yard for cabs, &c., broken intermediately by a garden. Entering under a verandah shelter, above which is a large clock, a wide passage-way leads into a circulating area of semicircular lay-out, of which the inner circumference is filled by the booking office. The outer circumference is lined by staff and other offices. To the right, in order: left luggage department, passageway to luggage entrance from station yard (ticket-collectors' and staff offices on one side), tobacco stall, hairdressing saloons (for ladies as well as gentlemen), and stationmaster's office. To the left: excess luggage, train office, passage-way to parcels yard, telephone office, dining room, and at the end a confectionery stall. The circulating area itself has a glazed roof, with artistic ironwork following the curve, and is designed for hanging flower-baskets, as elsewhere about the station. The cabinet work harmonises with the general artistic scheme.

To the left are the premises of the parcels department, with a covered yard, a bank at platform level against which vans can be backed, and direct access to the main down platform without interfering with passenger movements, a subway and hoists giving free communication with other platforms. To the left of the station yard are other station premises, with garden plots here and there, and the pathway to Shore Road Bridge already mentioned. To the right is a luggage passage-way direct to the main down platform, available as an alternative exit when traffic is heavy, and the offices of the goods department.

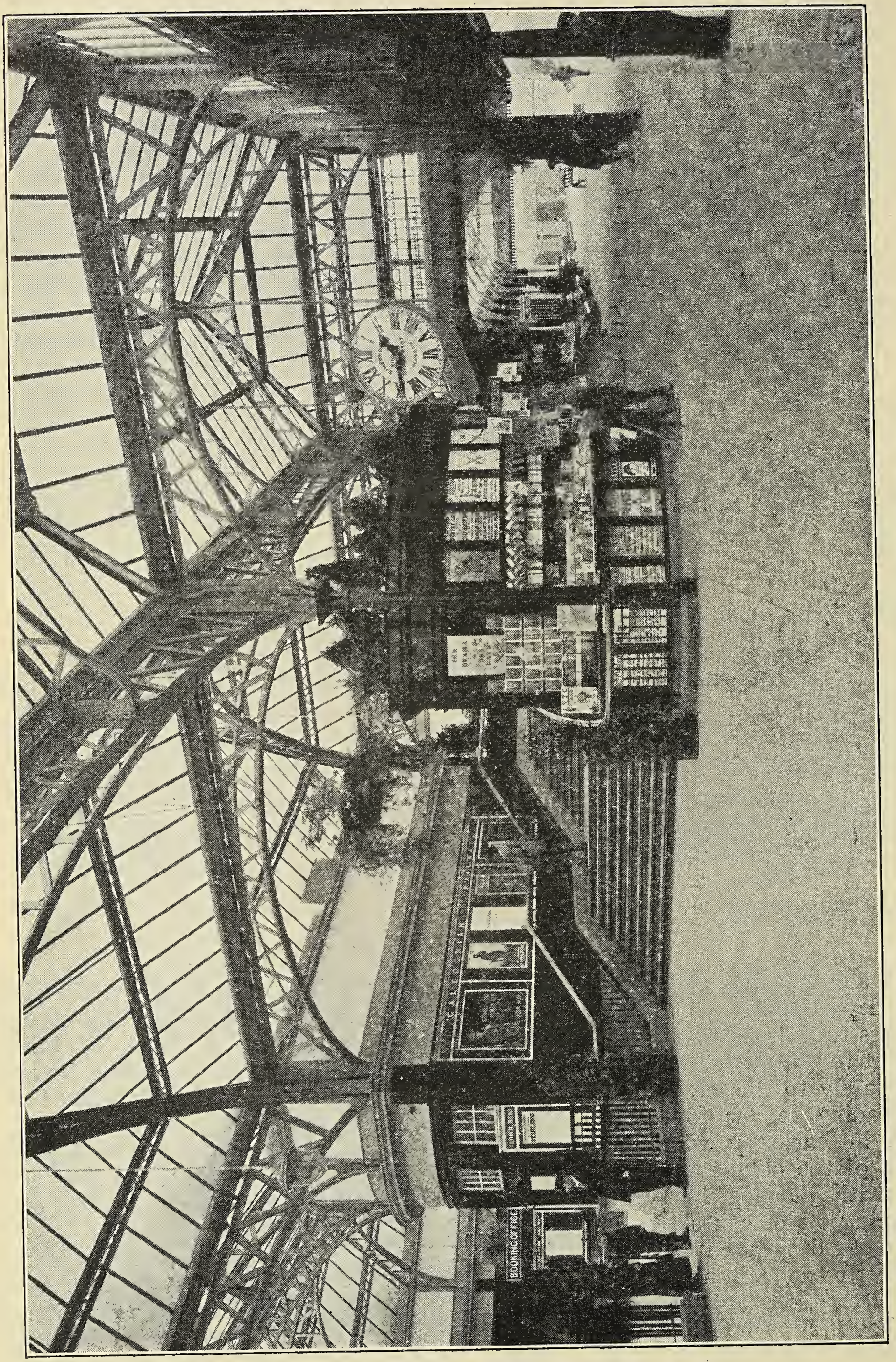


GOODS YARDS, ETC.

Access to the platform is through gates adjacent to the stationmaster's office, and immediately to the left is a curved staircase leading to the footbridge. This is roofed in harmony with the steel and glazing of the circulating area and decorated with hanging flower-baskets and shrubs in pots or containers, the arrangement being duplicated where the staircase descends to the main up platform. Behind the staircase, on the down platform, is a large bookstall, while beyond are, in one direction, confectionery stall, refreshment and dining rooms, and in the other, various waiting rooms and staff offices. At the north end is a bay platform, often used by local trains for the Callander and Oban line.

A considerable length of the platform is roofed over, and in this respect the main up platform forms an effective balance, this applying also to the lay-out of the footbridge staircase, tobacco and confectionery stalls, refreshment rooms, waiting rooms, &c., though the order is somewhat different. But, although the two main platforms are thus well sheltered and equipped, the rest of the station is rather less well served, in that the outer face of the main up platform, serving the alternative down line, is practically open throughout. Further, the outermost platform of all, an island serving the alternative up line and an outer line, is unsheltered, except for a block of buildings accommodating waiting rooms, lavatories, &c. Moreover, while the footbridge between the two main platforms is covered, the extension to the further island platform is open. The bay platforms, two at each end of the central platform, are entirely open.

It must be remembered, however, that all the main-line traffic is dealt with at the two chief platforms, so that it is only for interchange traffic with branch and connecting trains that the absence of shelter on parts of the station can be noted at all. In every other respect, however, the station ranks as one of the



DOWN MAIN PLATFORM AND CIRCULATING AREA.

best equipped and most artistically designed of its type.

The usual allocation of platforms is as follows: No. 1, behind main down platform, Callander and Oban or other northbound L.M.S. local trains; No. 2, down main; No. 3, up main; Nos. 4 and 5 (north bays), Forth and Clyde or L.N.E.R. local trains; No. 6, down relief; Nos. 7 and 8 (south bays), L.M.S. locals, also connecting trains, including those made up by the remarshalling of up main-line trains, to Edinburgh, &c.; No. 9, up relief; No. 10, outside spare line, signalled by up and down movements and available to meet the needs of periods of pressure. Usually L.N.E.R. through trains use Nos. 6 and 9 platforms, though they can be passed over the main lines, while L.M.S. trains can equally use Nos. 6 and 9. Either company's trains can be handled on No. 10, as need may arise. Goods trains are usually passed through on Nos. 6 and 9, or, if they are to be held, placed on No. 10.

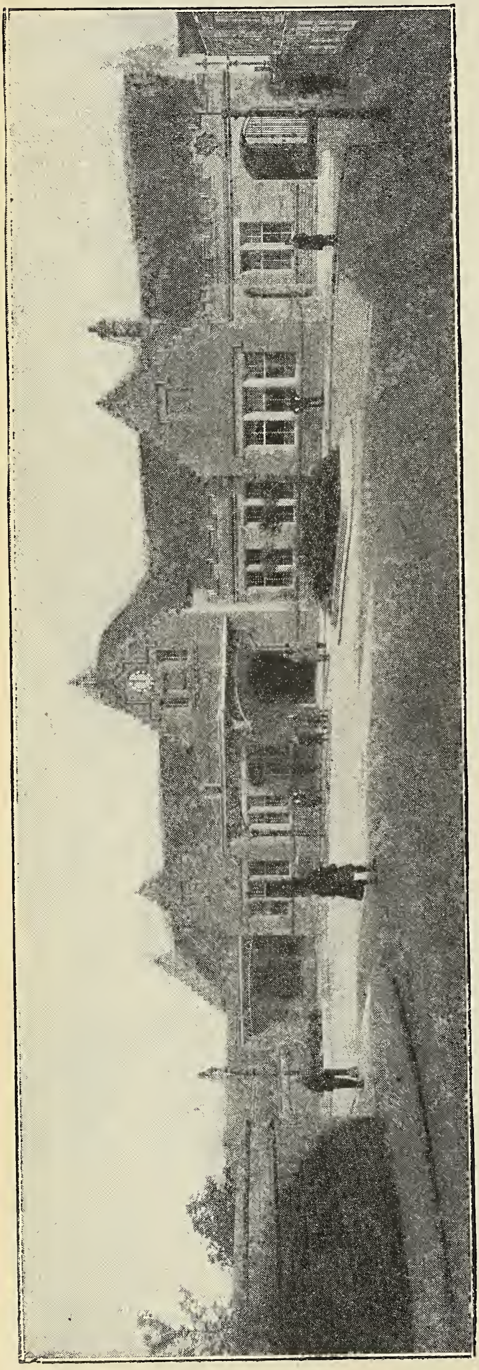
Beyond No. 10, south of Shore Road Bridge, is an up marshalling yard and beyond are tracks serving Government Ordnance premises. On the down side, partly behind No. 2 platform, is the L.M.S. goods shed and offices, and for some distance down the line the running tracks are paralleled by extensive carriage and goods sidings. North of Shore Road bridge, there are, on the left, shunting tracks, municipal cattle pens and local goods and coal accommodation, while on the up side is the L.N.E.R. goods yard and offices, carriage sidings, engine shed, &c.

Of the many tracks on one or both sides of the running lines, eight pass under Shore Road Bridge (including the platform serving Nos. 1 and 2). These settle down into four running lines, Forth and Clyde L.N.E.R. trains transferring to the L.M.S. main tracks for a short distance, though almost immediately they diverge on the left, while L.N.E.R. trains run on their own lines to cross the Forth by a bridge alongside that used by L.M.S. trains. The Forth and Clyde line had its own engine shed and goods yard a little way along the branch, though under present conditions the accommodation here is utilised as convenient, in conjunction with the L.N.E.R. shed near the river bridge.

At this stage it is necessary to revert to the subject of Stirling's places of interest, in that several features associated with the railway lay-out call for reference, particularly the windings of the River Forth. Beyond the Government Ordnance factory and the up marshalling yard already mentioned is one loop of this winding river, here of moderate width, so that one has some difficulty in recognising it as the same stream as that crossed, many miles farther down, by the great Forth Bridge, or even, at a point much nearer, by the L.M.S. viaduct and opening bridge at Alloa. This loop is, therefore, quite close to the town and station, and conveniently reached from Shore Road Bridge. This route is taken in visiting several places of local interest, the river being crossed by ferry. But before reaching the famous Stirling bridges, a bare half mile from the station direct, the river goes a mile or so round, farther indeed than Causewayhead, the first station towards Alloa, then looping back to skirt the base of the mass of rock on which stands Stirling Castle, overlooking the town, and at this point it is crossed by no fewer than four independent bridges close together.

One is the successor to the old original bridge built in 1410, and presumably almost on the site of that concerned in the famous battle of 1297. The present bridge is of the old-fashioned type, with four arches. About 100 yards away is the "New" bridge, which now carries most of the road traffic, though as it was built by Robert Stephenson in 1831 its name can be used in a comparative sense only. Another 100 yards along are the two railway bridges, separate but close together. These are generally similar in design, though differing in detail, and have two intermediate piers each, with an arch span over the public roads on each side. They are of girder type, with the girder structures below rail level. One is the property of the L.M.S. Company and the other of the L.N.E.R.

The Forth and Clyde line does not need to cross the former river, though, in view of further meanderings of that wandering stream, it does not join company again for several miles. As it curves away from the L.M.S. line on the down side it comes quite close to the New bridge, and as it becomes single-track a somewhat peculiar level crossing lay-out is involved. Two roads converge upon the New bridge, so that no fewer than four separate gates are necessary as the railway crosses them in order, with a stretch of green between. Adjacent is a clock tower erected many years ago as a memorial to a local worthy.


GENERAL VIEW OF STATION BUILDINGS.

Some 385,000 tickets are issued annually at Stirling station, and about 600,000 collected. Over £100,000 are taken annually in regard to passenger traffic. About 110,000 platform tickets are issued in twelve months.

Station premises are steam-heated from a central plant, and electrically lighted, as also the yards, throughout. There are three signal-boxes, South (21 levers), Middle (86 levers), and North (102 levers).

The L.M.S. staff attached to the station and under Mr. McWhirter, stationmaster, includes 9 clerks, 5 telegraph clerks, 2 inspectors, 4 foremen, 6 ticket collectors, 7 shunters, 32 porters, and 15 signalmen and booking lads, together with 4 passenger guards attached to the station. There is no L.N.E.R. passenger station staff, though that company has, of course, its own goods and shunting and engine shed staff. L.M.S. goods and mineral yard working is under the direction of Inspector Donnachie, with 1 clerk, 6 yard foremen, 18 shunters and 35 goods guards, while Mr. Chalmers, as Goods Agent, has 10 clerks and 15 shed men. Mr. Gibson is loco. foreman, with 2 assistant foremen, 5 clerks, and 252 running and shed men. Usually 22 passenger, 25 goods and 6 shunting engines are operated from Stirling L.M.S. shed.

Traffic at the station can be thus broadly classified :—

L.M.S.R.

5 up and 5 down London expresses.
Up and down mail trains.
6 up and 6 down Glasgow–Aberdeen expresses.
4 up and 4 down through Oban line trains.
7 up and 7 down, Edinburgh (Princes Street) trains.

Also, through services to and from Dundee, and local trains to Perth, Crieff, Gleneagles, Callander, Dunblane, Larbert, Grangemouth and Glasgow, and three through fish trains, parcels trains and through and local goods trains, &c. Colliers' trains to and from Manor Powis and Polmaise collieries may also be mentioned.

L.N.E.R.

5 Forth and Clyde trains each way.
8 Edinburgh via Alloa, Dunfermline and Forth Bridge.

Also several trains between Glasgow (Queen

Street) and Perth via Stirling and Alloa, locals to Alloa, and giving connections for Dunfermline, Thornton Junction, Fife watering places, &c., and to Buchlyvie (for Aberfoyle).

Mention has already been made of the fact that many of Stirling's most interesting trains are associated in groups, for which reason, also because this course will bring out many features of interest, it will be best to review the day's services in order. The summer arrangements are considered, attention being given first to the L.M.S. services.

From the south there are no important L.M.S. main-line services, though a number of goods and other trains work through, after the 12.15 a.m. for Dunblane has left, until, at about 4 a.m., the relief Highland and Aberdeen sleeping car express passes through, that is, unless one train only is run, which occurs rather infrequently, except, perhaps, right at the beginning or near the end of the season. Usually, there is one train for the Highland line and another for Aberdeen, the latter bringing the Oban sleeping car and through vehicles, unless that traffic, too, demands a complete train to itself. The Oban vehicles are usually transferred to one of the sidings beyond No. 1 platform, as there is no need to send them forward until 5.50 a.m., in view of the intermediate station traffic which they also carry. At 4.44 a.m. Stirling has its first public time-table train, by the 7.40 p.m. from Euston, the main Aberdeen and Inverness sleeping car train. This brings the Oban section on Sunday nights, and during the quieter months of the year is the standard sleeping car service from London for all parts of Scotland north of Edinburgh and Glasgow.

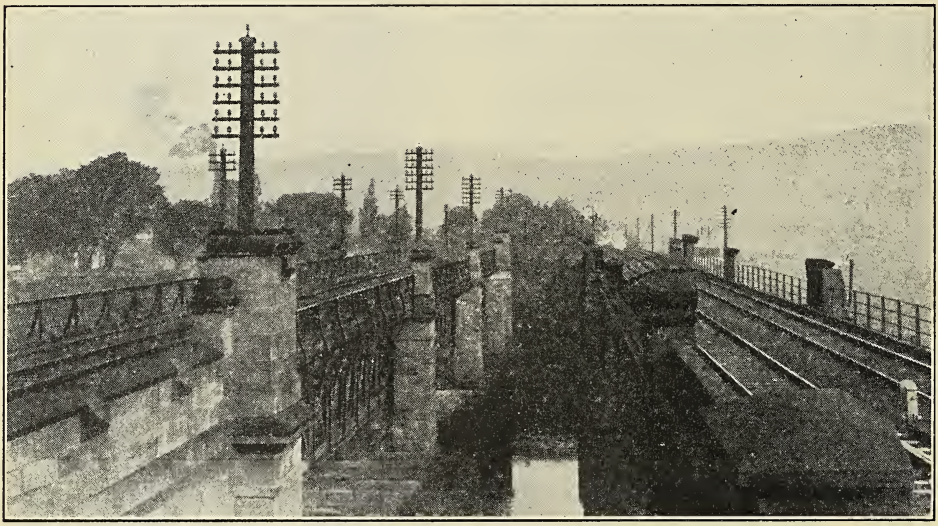
At 5.17 a.m. a train arrives from Glasgow (Central), whereas the usual Glasgow terminus is Buchanan Street. This is the Glasgow connection with the postal train, which, after the Glasgow vehicles have been combined with it (5.17–5.29 a.m.) becomes a " Limited Mail " train, in that its passenger accommodation is restricted to that of the standard four vehicles (in addition to mail vans), and the time-table explains that local passengers are " only conveyed from Stirling, if room." This train is, in fact, timed very fast beyond Stirling, a further reason for limiting its make-up.

Following this, thus timed to enable them to take on transhipped mails, are the 5.35 a.m. Gleneagles and Crieff, and the 5.50 a.m., already mentioned, to Callander and Oban. At 7.9 a.m. a stopping train leaves for Perth and Dundee, and after the arrival at 7.55 a.m. of a train from Edinburgh at 8.3–8.6, the 7.15 a.m. Pullman Restaurant Car Express from Glasgow is dealt with. This is followed, at 8.13–8.16 a.m., by the Aberdeen section of the 11.5 p.m. from Euston. This includes sleeping cars for Dundee, while a Pullman Restaurant Car, attached at Carstairs, provides breakfast facilities for Aberdeen passengers, available also for Dundee passengers as far as Perth. This train does not pick up at Stirling (or at Gleneagles), as local passengers are sufficiently catered for by the preceding train. At Perth the two are combined. At 8.35–8.42 a through train from Carstairs comes along, its calls being largely governed by the requirements of long-distance passengers who have changed from the express, while local needs are partly supplied by the 8 a.m. from Glasgow to Oban, which calls at Stirling, 8.46–8.50.

At 9.13–9.18 a stopping train from Glasgow to Perth is dealt with, and is followed by the 9.15 a.m. Glasgow to Perth express, and the 9.25 a.m. from Edinburgh to Perth. These are dealt with at Stirling, 10.1–10.3 and 10.20–10.24, respectively, the latter detaching a through carriage from Edinburgh to Killin Junction (in conjunction with some of the special summer tours associated with the Callander and Oban line) which goes forward from Stirling at 11.5 a.m. The two expresses mentioned constitute feeders at Perth to the 10 and 10.10 a.m. expresses from Glasgow. The first of these, a Pullman Restaurant Car Express for the Aberdeen route, makes its first call at Gleneagles, while the second, mainly for the Highland line, with a Pullman Restaurant Car as far as Aviemore, detaches at Stirling, 10.54–10.57 a.m. the Glasgow vehicle for Killin Junction, which, with the Edinburgh coaches attached, goes forward at 11.5 a.m.

This completes the morning series, and for some time a few ordinary trains only are dealt with, 12.30–12.33 p.m. Edinburgh to Dunblane (on Saturdays to Greenloaning) ; 12.54–1.4 p.m. Glasgow to the Callander and Oban line ; 1.18–1.24 p.m.

Glasgow to Perth stopping train; 1.51–1.54 p.m. Glasgow to Dunblane (Saturdays only). At 2.3–2.6 p.m. an Edinburgh–Perth Express inaugurates another series, as it is followed by the running through Stirling of the 1.30 p.m. Glasgow–Aberdeen Pullman Restaurant Car Express, first stop Gleneagles, and the calling of the 1.40 p.m. Dundee and Inverness Express from Glasgow at Stirling, 2.30–2.34 p.m. and the division therefrom of the 2.42 p.m. ex Stirling to Callander. At 2.47 p.m. a Glasgow train arrives on Saturdays; at 3.52 p.m. a local from Larbert comes in on the same day; and at 4.15 p.m. a local leaves for Dunblane and Greenloaning.



L.M.S. (LEFT) AND L.N.E. (RIGHT) RAILWAY BRIDGES OVER THE RIVER FORTH NORTH OF STIRLING.

Then at 4.30 p.m. a train from the south arrives, in connection with the 2.35 a.m. from Euston and Liverpool and Manchester Anglo-Scottish services, and including a restaurant car running between Crewe and Stirling. This finishes at Stirling, but acts as a feeder to the 4 p.m. from Buchanan Street for Gleneagles and Crieff. This train, at Stirling 4.52–4.54 p.m. also divides to form the 4.59 p.m. to Callander. At 5.21–5.24 p.m. an Edinburgh–Perth train precedes and collects for the 5.0 p.m. Pullman Restaurant Car Express from Glasgow to Aberdeen, at Stirling 5.44–5.47 p.m., and behind the latter is the 5.10 p.m. Glasgow–Oban train, at Stirling 5.57–6.0 p.m. A stopping train at 6.15 p.m. to Perth and the 6.32–6.39 p.m. from Glasgow to Dunblane fill the interval until the 6.5 p.m. Glasgow–Aberdeen Restaurant Car Express arrives at Stirling, 6.52–6.54 p.m. This is immediately followed by the 7.0 p.m. to Callander, and at 7.2 p.m. the Aberdeen portion of the 10.0 a.m. ex Euston comes in (to set down passengers only), in that the 6.54 and 7.0 p.m. meet local requirements. At 7.22–7.30 p.m. a stopping train from Larbert to Greenloaning (Gleneagles on Saturdays), and at 9.2–9.5 p.m. a Glasgow–Dunblane train complete the day's work, except for the 11.1 p.m. (combining at Stirling the 9.45 p.m. from Edinburgh and the 10.0 p.m. from Glasgow, with a through carriage from Glasgow to Wick and a sleeping car, Glasgow to Inverness, except Saturdays), the 11.50 p.m. (Perth portion of the 1.30 p.m. from Euston) and the 12.15 a.m. local train from Stirling to Dunblane, which runs on to Callander, if required, for through passengers from England. The only trains on Sundays in this direction are the 7.15 a.m. from Glasgow (Central) to Aberdeen, at Stirling 8.21–8.26 a.m., and the 11.5 p.m. ex Euston, which arrives at 8.51 a.m., leaves at 8.54 a.m., and is followed by the 9.10 a.m. to Oban.

To a great extent the up services include similar characteristics, though, as will be seen, differently applied, so that it will be most convenient to set them forth in a general statement with the assistance of brackets and a few notes.

From	Arr.	Dep.	To
	a.m.	a.m.	
Perth	7 12	7 18	Glasgow.
Inverness (*a*)	8 2	8 4	Glasgow.
Callander	8 28	8 31	Glasgow.
		8 35	Larbert and Denny.
Comrie	9 1	9 4	Glasgow ("Strathearn" Express).
		9 12	Edinburgh.
Dundee (*b*)	9 38	9 41	Glasgow (*b*).
Oban	9 44		
Aberdeen and Dundee	9 53	9 57	London and the South (*b*).
		10 4	Edinburgh.
		10 9	Glasgow.
Perth	11 20	11 26	Glasgow.
	p.m.	p.m.	
Oban	12 32	12 38	Glasgow.
Aberdeen	1 8	1 12	London and the South (*b*).
Aberdeen	1 22	1 25	Glasgow (*b*).
Dunblane (N.S.)	1 30		
Greenloaning (S.O.)	1 33	1 39	Larbert and Denny (S.O.).
Callander (S.O.)	2 3		
Dunblane (N.S.)	2 10		
Perth	3 9	3 16	Edinburgh.
Oban	3 34	3 41	Glasgow.
Inverness (*b*)	3 59	4 2	Glasgow.
		4 12	Larbert.

Aberdeen-Glasgow Restaurant Car Express passes through, calling at Bridge of Allan but not Stirling.

Aberdeen (*b*)	4 37	4 41	Carlisle and the South (*b*).
Callander	4 44	4 48	Edinburgh (S.O.).
Greenloaning	5 18	5 20	Larbert.
Aberdeen (*b*)	6 22	6 26	Glasgow (*b*).
Perth	7 2	7 8	Larbert.
Oban (*b*)	7 20	7 28	Edinburgh.
		7 34	Glasgow.
Perth	8 13		
Inverness (*b*)	8 23	8 30	Glasgow (*b*).
Aberdeen (*b*)	8 37	8 40	Glasgow (*b*).
Oban (*b*)	8 45	8 53	Glasgow (*b*).
Dunblane	9 37		
Inverness (*a*)	9 56	10 8	London and the South.
Aberdeen (*a*)	10 51	10 55	London and the South.
Aberdeen	11 5	11 11	Glasgow (Central).

SUNDAYS.

From	Arr.	Dep.	To
	p.m.	p.m.	
Aberdeen (*b*)	4 43	4 47	Carlisle and the South (*b*).
Aberdeen	5 2	5 10	Glasgow (Central).
Dundee	9 22	9 24	Glasgow (Central).

(Combined with the last is the sleeping car train from Dundee to London and the South, division being made at Coatbridge.)

(*a*) Sleeping car.
(*b*) Restaurant car.

The foregoing particulars, necessarily somewhat lengthy, will give not only a good impression as to the importance and volume of L.M.S. traffic at Stirling, but also an indication of the many features of interest attaching thereto.

On the L.N.E.R. side the arrangements are very much simpler, but the trains add very materially to the traffic facilities which centre on Stirling. For example, trains arrive at Stirling from Edinburgh via the Forth Bridge, Dunfermline and Alloa at 7.35, 9.42 and 10.26 a.m., and at 12.29, 2.52, 5.49, 7.19, 8.13, and 9.39 p.m. Several of these are semi-fast, and the 9.15 a.m. ex Waverley is of interest in that it brings through carriages for Aberfoyle and Balloch, going on from Stirling at 10.37 a.m., an important factor in the L.N.E.R. " Trossachs Tours." The return trains leave Stirling for Edinburgh at 7.53 (to Dunfermline), 8.15, 10.5 a.m., and at 12.10, 1.40, 4.0, 5.48, and 8.27 p.m. This last conveys the return coaches from Balloch and Aberfoyle.

Another L.N.E.R. service, this time not terminating at Stirling, is that from Glasgow to Perth via Stirling and Kinross Junction. These trains leave Queen Street (Glasgow) at 9.0 a.m., 1.32, 4.47 and 7.38 p.m., with a train as far as Alloa (via Stirling) at 10.5 p.m. There are also trains starting from Stirling at 5.12 p.m. to Alloa, at 7.0 p.m. to Perth, and at 9.15 p.m. to Alloa, and on Saturdays to Dollar. The return trains arrive at Stirling at 8.19 a.m. (from Kinross Junction), 10.32 a.m. from Dollar, 4.37 and 6.26 p.m. from Alloa, and at 9.32 p.m. from Perth to Glasgow. A few trains on this service travel via the L.M.S.R. direct between Larbert and Alloa via Alloa Bridge, thus

MR. W. E. McWHIRTER,
Stationmaster,
Stirling.

avoiding Stirling. There are, however, some additional trains between Stirling and Alloa, so that quite a plentiful service is provided on this section.

On the Forth and Clyde line trains leave Stirling for Balloch at 6.40 a.m., 7.25 a.m. (to Buchlyvie only), 10.37 a.m. (with the through coaches from Edinburgh to Balloch and Aberfoyle already mentioned), 2.57 p.m., 4.10 p.m. (not Saturdays, to Balfron), and 6.6 p.m. The return trains arrive at Stirling at 8.10 a.m., 8.49 a.m. (from Buchlyvie), 9.58 a.m., 11.59 a.m. (from Buchlyvie), 5.6 p.m., 5.59 p.m. (not Saturdays, from Balfron), 8.4 p.m. (with through coaches from Balloch and Aberfoyle to Edinburgh).

Many of the trains mentioned, both L.M.S. and L.N.E., are included in special tours, among which we may refer to the various forms of the famous "Trossachs Tours" and services in conjunction with the MacBrayne steamers via Oban, the Caledonian Canal, etc. A wide variety of excursion and tourist arrangements is also in force, so that, at Stirling, the visitor has an exceptionally varied assortment of facilities from which to choose, far too comprehensive to be set forth in detail. Locally, the golfer has the advantage of being handy to Gleneagles, which claims the finest and best-equipped golf courses in Scotland; he has the waters of the Forth close at hand for boating and angling, and many other attractive and, in some cases, historic waters within easy reach, and by rail or road he has ready, convenient and inexpensive access to scores of places of historic and scenic interest. Incidentally, suitable series of local season tickets are issued in the season, providing for travel as frequently as desired between various points, besides standard excursion facilities in great variety and occasional special ones.

Although Stirling is of so great importance as a tourist and traffic centre, and as a resort on its own account, the town itself produces a good deal of business. Thus, it is a great centre for cattle sales, a busy market town, the capital of Stirling County, and it is not only concerned in the distribution of coal throughout a large district, but there are also collieries quite close, near the banks of the River Forth south and east of the station area. There are also extensive timber yards served by railway sidings. Fish and fruit traffic, too, is handled in considerable volume, both on goods and passenger trains. Military traffic is another substantial feature, in that the Castle is the depôt for the Argyll and Sutherland Highlanders, while Detention Barracks, a Military Hospital and the Ordnance Depôt add further responsibilities in this connection.

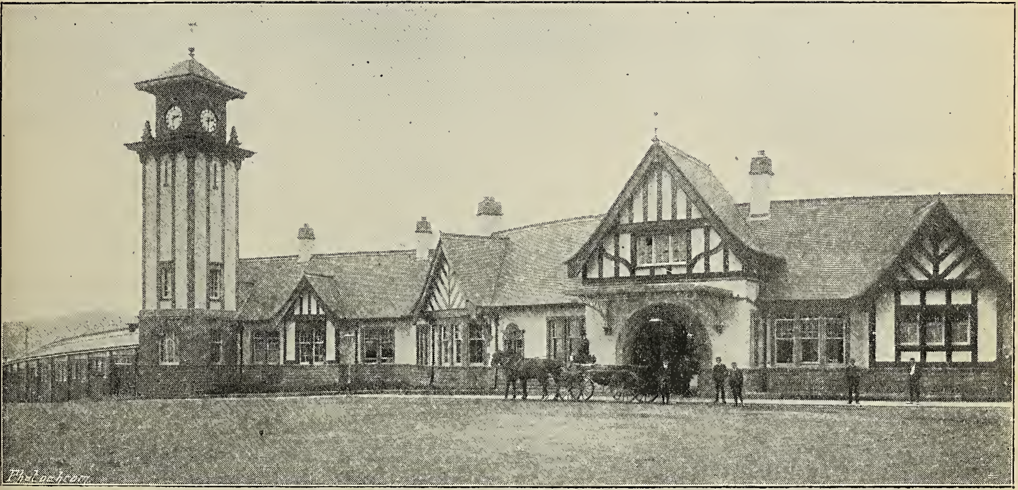
◆

July 1905

Holiday Traffic at Wemyss Bay Station.

By J. T. Lawrence, M.A.

WEMYSS BAY is the terminus of a line which leaves the Glasgow Central station, and runs for about thirty miles along the south bank of the Clyde to a point on the coast a few miles beyond Greenock. As far as Port Glasgow the line follows the course of the estuary in full view of the many shipyards which have made the Clyde famous in every part of the world. Passing Dumbarton with its well known rock, which seems to stand guard over the incalculable wealth behind and beyond it, the river begins to widen, and at Upper Greenock the line strikes inland in a south-west direction, and after passing through one or two small tunnels and the pretty village of Inverkip the coast is again reached at Wemyss Bay—known to the Ordnance Map, we might say, by the less euphonious name of Skelmorlie, N.B.



EXTERIOR OF WEMYSS BAY STATION.

The line, originally single, was constructed in 1865, and even to-day four miles of it—beginning at Port Glasgow, remain single. Until the year 1890 the Glasgow terminus of the line was at Bridge Street, the station transferred from the Glasgow and South-Western, but since then the handsome bridge across the Clyde has afforded access to the Caledonian Railway's main line terminus.

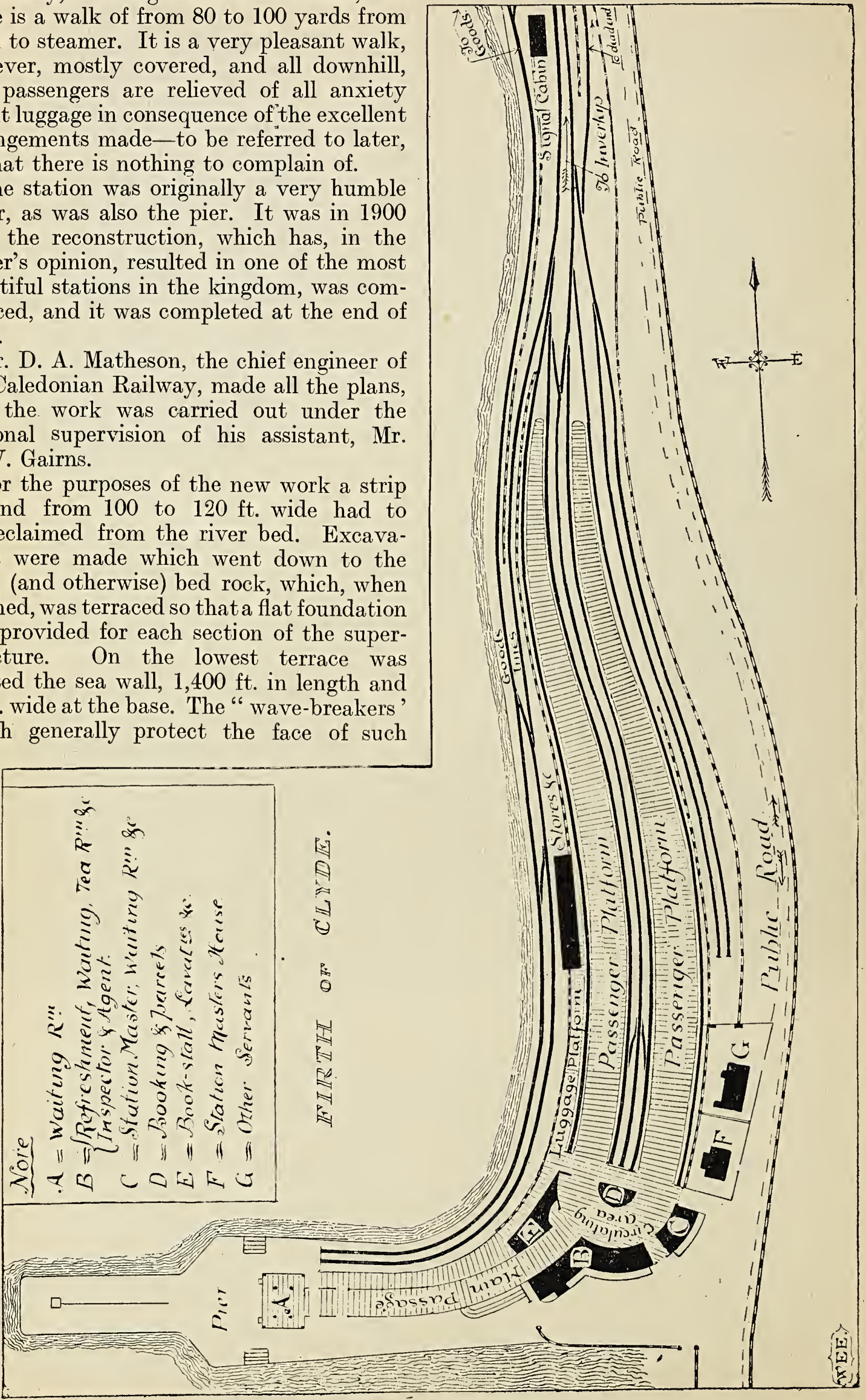
Wemyss Bay is not a suburban residential resort. There are residents, it is true, but they are of the kind who live in castellated mansions, and are clothed in purple and fine linen, and who drive motor cars. Nor—outside the railway station—is there anyone at Wemyss Bay who wants to see the tripper. Probably the feeling is reciprocated, for Wemyss Bay is about the last place the ordinary tripper would think of spending a day in. There are no sands—no niggers—no band—and very few houses of refreshment. Nine persons out of every ten probably who use the station know it only as the point of transfer from train to steamer. In laying out the passenger accommodation it was found impossible to arrange for the trains to run alongside the steamers as is the case at Gourock. There were no engineering difficulties that could not have been overcome, but the negotiations with neighbouring landowners somehow failed, and so when it was determined to reconstruct, the new work was perforce carried out on the lines of the existing structure.

Reference to the plan of the station and pier will show that this means that the pier is, practically, an elongation of the station, and there is a walk of from 80 to 100 yards from train to steamer. It is a very pleasant walk, however, mostly covered, and all downhill, and passengers are relieved of all anxiety about luggage in consequence of the excellent arrangements made—to be referred to later, so that there is nothing to complain of.

The station was originally a very humble affair, as was also the pier. It was in 1900 that the reconstruction, which has, in the writer's opinion, resulted in one of the most beautiful stations in the kingdom, was commenced, and it was completed at the end of 1903.

Mr. D. A. Matheson, the chief engineer of the Caledonian Railway, made all the plans, and the work was carried out under the personal supervision of his assistant, Mr. R. W. Gairns.

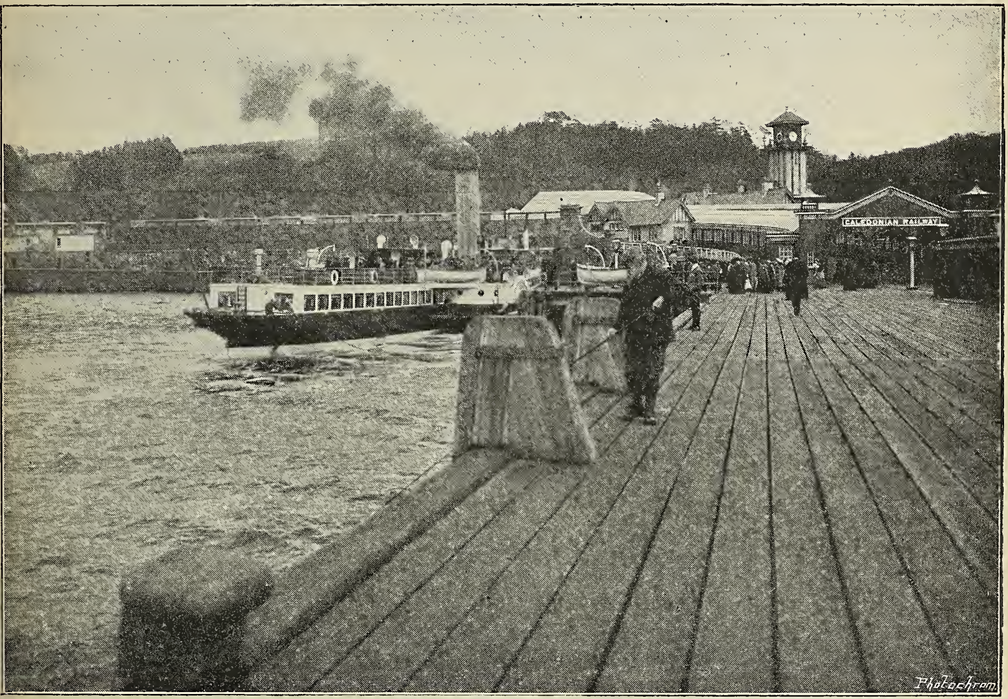
For the purposes of the new work a strip of land from 100 to 120 ft. wide had to be reclaimed from the river bed. Excavations were made which went down to the hard (and otherwise) bed rock, which, when reached, was terraced so that a flat foundation was provided for each section of the superstructure. On the lowest terrace was erected the sea wall, 1,400 ft. in length and 16 ft. wide at the base. The " wave-breakers ' which generally protect the face of such an embankment, are in this case unnecessary, the coast not being exposed to the fury of an



PLAN OF WEMYSS BAY STATION AND PIER.

Atlantic gale, but a similar end has been attained by making the wall of a curved section, on the principle upon which the deck of a battle-ship is of convex contour, so that in the event of a gale, the sea would only have an oblique surface to impinge upon.

The station is practically built upon arches the piers of which rise from the rock foundation, each of them supporting a pair of the columns which are so effective a feature of the adornment of the station. These columns it might be said, are hollow and convey the drainage from the roof along suitable channels. They are kept in their places by bolts 10½ ft. long, let into the concrete and tied in two places by rails 10 ft. apart.



WEMYSS BAY PIER AND ENTRANCE TO RAILWAY STATION.

On stepping out of the train on reaching its destination, the passenger from Glasgow who is visiting it for the first—or even for the twenty-first time—looks round and scarcely knows what to admire most. The graceful curves of the ground plan, in which the only suggestion of a straight line is that afforded by the buffer stops, the delicate tracery of the steelwork which carries the azure tinted roof of frosted glass, the impression of light and "coolth," the semi-circular area bounded by the various offices, the luxurious and dainty tea rooms, the floral decorations, all in turn invite regard.

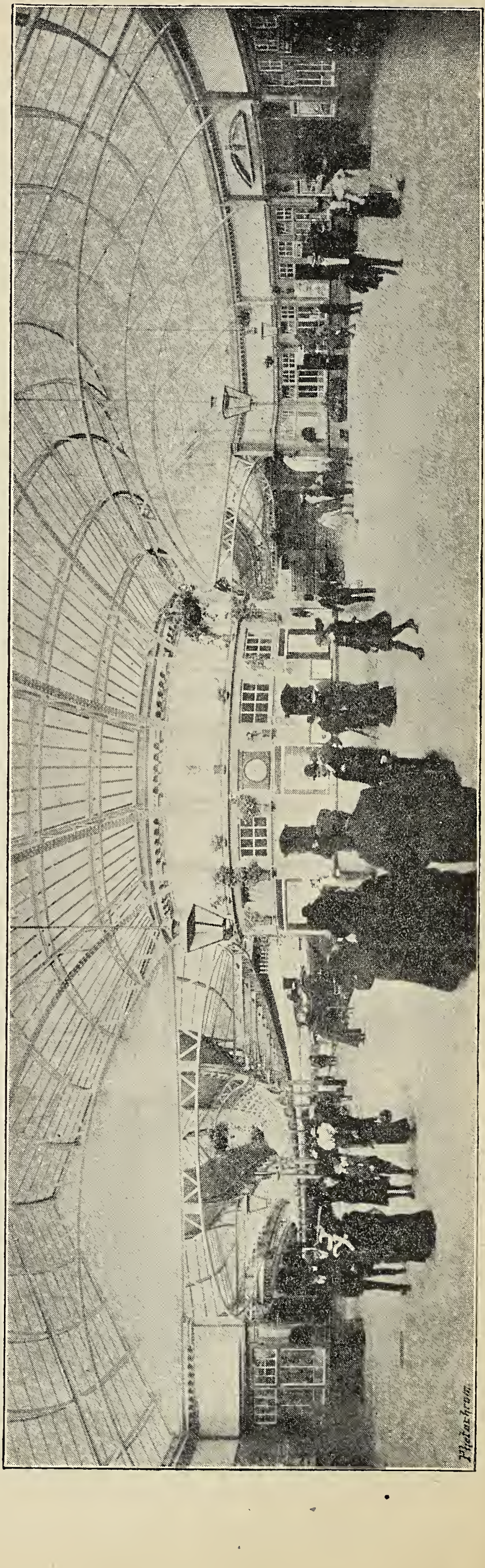
Looking down the platforms we notice the suggestion of fan tracery in the spring from the capital of each pillar. As stated these are in pairs along each platform, and are so disposed that lines drawn through corresponding groups would form the radii of a circle. Pillars and all the rest of the steel work, it should be said, are painted white, and, owing to the absence of dust and smoke, they have a chance of remaining so. They are 10 ft. in height, and 16 ft. to the centre of the arch.

The floral decorations demand especial notice. Brackets to the number of 35, enamelled in cream colour, are placed uniformly around the circulating area. These support pots of choice flowers, whilst more than a dozen tubs are appropriately disposed on the floor containing flowering shrubs. Mr. Robison, the station master, is a horticulturist of no mean order, and takes personal charge of this department, and his own private garden is practically a nursery ground for the station, and thus the supply of these beauties of nature, whether displayed in pot, tub, or hanging basket, is well maintained. Looking round with more attention to detail, we note the entire absence of public advertisements. It may be possibly that pills and patent medicines are a superfluity in the tonic breezes of Wemyss Bay, but it is quite certain that the absence of such advertisements conduces much to the appearance of the station. It is computed that the Caledonian Railway loses a sum equal to the interest at 5% on a capital outlay of £15,000 by not leasing the walls for advertising purposes.

The station is not without mural decoration, however, and of an effective kind. The pictorial advertisements of the Caledonian Railway and others in connection, are of the most artistic kind. They are uniform in size and enshrined in nicely painted uniform frames, and form a sort of dado round the station, above which is a space about 5 ft. wide, and cream coloured, which is at present destitute of decoration. This is what advertisers have longingly looked at, but even if they are barred there is no reason why the railway should not fill the vacant spaces with frescoes. At all events we offer the Caledonian Railway the suggestion.

We may now pay some attention to details. We first look into the stationmaster's office, the walls of which are adorned with 130 photographs, in gilt frames, being those of celebrities who have used the station, and of railway magnates, from Sir James Thompson downwards. Mr. Robison has been stationmaster for more than twenty years, and previously served in similar capacities at Shotts and at Upper Greenock, having worked his way up in the Caledonian Railway's service, which he entered in 1865, from the lowest rung of the ladder.

Waiting-rooms do not fill such an important *rôle* at Wemyss Bay as they do where train connections have to be waited for. Trains and steamers connect in such wise that waiting is reduced to a minimum, and moreover the tea-rooms prove a powerful counter attraction to the delights of the waiting-room. These are very dainty apartments, enamelled, the one in white, first-class, the other, second-class, in green. Little basket tables, with snowy white tea-cloths, and surmounted by the expensive but fragile china ware, out of which ladies seem to prefer to drink their tea, the side-board,



THE CIRCULATING AREA WEMYSS BAY STATION.

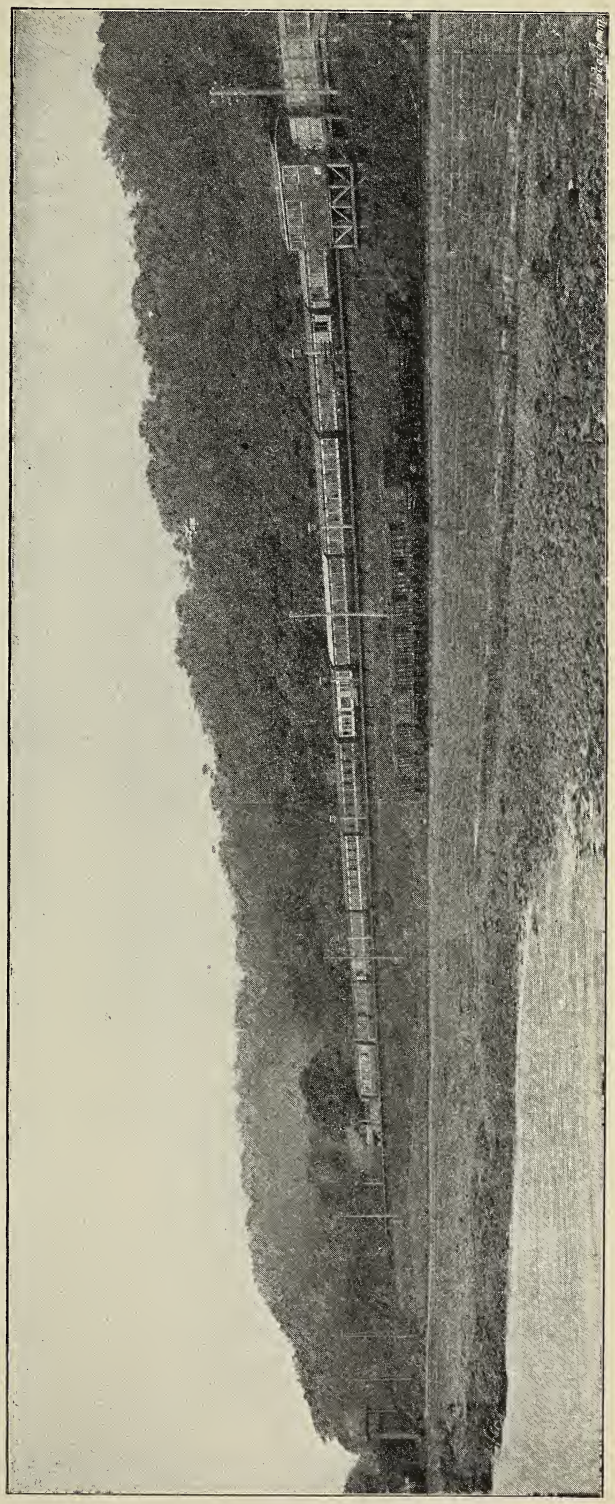
decorated with expensive cakes and comfits, laid out in shining electro ware, all serve to make them adjuncts to a ladies' boudoir rather than a railway station.

The writer's curiosity led him to make friends with the *habitués* of the porters' room, which apartment was luxuriously furnished with easy chairs and couches. Truth, however, compels us to state that much of this furniture had a second-hand look about it. The walls were adorned with the prevailing mural decoration of the station, supplemented by information as to how the frequenters of the room might better their prospects by emigration. We doubt it.

The booking-hall is semicircular, concentric with the circulating area with its back to the buffer-stops. The ticket windows are of striking design in keeping with the style around. As most of the tickets dealt with at Wemyss Bay are of the through description, local bookings do not demand much space, and so the same office is used for cloakroom and parcels, both inward and outward.

Passengers' luggage is dealt with at a special platform 250 ft. by 18 ft., next to the boundary wall of the station on the side next to the sea wall. At a distance this wall has a pleasing appearance, being pierced at regular intervals along its whole length. The vans containing the luggage are usually next to the engine, and horse drays and vans are drawn up for its reception on the platform—which is of wood, to save slipping. It is then conducted to the steamers along a special way, separate from that used by passengers, who, therefore, are relieved of all trouble.

The passenger platforms are 780 ft. in length—500 ft. of which are covered—with width varying from 15 ft. to 36 ft.



GLASGOW MORNING EXPRESS LEAVING WEMYSS BAY STATION AFTER ARRIVAL OF STEAMERS.

The goods lines run on to the pier outside the station on a lower level. On a still lower level is a line of rails devoted to the carriage of coal for steamer purposes, and then comes the sea-wall.

Four steamers can lie alongside the pier, or three if the end berth be used. Their movements are controlled by semaphore under the direction of Mr. Melrose, who has been pier-master for 21 years. The alterations involved a doubling of the width of the pier. The piles are of green heart, faced on the outside with elm, which, as being a tough wood, makes a very effective fender. The passage way to the pier from the station is covered with a rough plate-glass roof, and it continues the curve of the station. It is 30 ft. in width, and about 120 ft. long. Here are situated the offices of that department of the Caledonian Railway known as the Caledonian Steam Packet Co.

Before noticing what Wemyss Bay has to offer to the public in the way of travelling facilities, we might have a look at the outside of the station.

It is in Queen Anne style, half timber, and rough cast with red sandstone facings, and there is a clock-tower of similar design 60 ft. high visible from a considerable distance in all directions. The residences of station-master and men, which immediately adjoin, are of corresponding design. In front there is a fine and spacious forecourt affording accommodation for a large number of carriages, and in the season this is crowded.

CORNER OF TEA ROOM, WEMYSS BAY STATION.

One internal feature yet remains to be noted. The various caution boards which allude to the demeanour of the travelling public are in keeping with the high tone which prevails everywhere. Such notices usually terminate with stringent reference to the rigours of the law, and 40s. and costs. Here passengers' finer instincts are appealed to, and they are "respectfully requested" to do what, elsewhere, they have to be frightened into doing.

Very close to Wemyss Bay, and, in fact, forming part of the route from thence to Largs further south, is the "measured mile." This is a stretch of water, along which the products of the Clyde shipyards show their paces, whether battleships, leviathan Cunarders, or the uncared-for tramp. These displays are not extensively advertised, for the unofficial photographer is discouraged, but they leak out nevertheless, and the Glaswegian takes a natural interest in comparing the quantity and quality of the tonnage which is Glasgow's staple product, with the turn-out of its great rival, Belfast.

People who run off to Norway to explore the Fjords, can have no conception of the beauties of the part of Britain we are trying to describe. Nearly one hundred years ago, 1812, to be exact, Scottish tourists used to be conveyed up and down the Clyde in what was probably the first steamer ever built, the *Comet*, of twenty-five tons and three h.p. Now-a-days, a whole fleet of twenty-knot steamers traverse the inland sea into which the Clyde empties itself. And three important railway companies are engaged in a competition, the like of which is unknown in England. So acute has it been in time past, and even now is, that ordinary people would have been driven to their wits' end long ago. But Scotchmen are not ordinary people, and when they get to that point they generally find a fresh length of wit to be going on with; and so, instead of stealing each other's traffic, each of the railways concerned has created an entirely fresh volume. With the handbook of the Caledonian Railway before him, it is, one would think, difficult for anyone who has the wherewithal to pay an honest railway fare, to stop at home. Whether he be interested in scenery, or in the state of his health, or in golf, or in fishing, or in poetry, or in cycling, accurate and reasonable provision is instantly made for him.

To Wemyss Bay, the Caledonian Railway is not hampered by competition. Moreover, there are no heavy works, like those which give access to the harbours at Greenock and Gourock, and, therefore, the outsider may be excused for thinking that, had the possibilities of Wemyss Bay been recognised earlier, and suitable deep water accommodation provided, a very decided point would have been scored in the competition. On the other hand, it has to be remembered that for a long time all the coast traffic of the Caledonian Railway was handicapped by the inconvenience of the Glasgow terminal, only remedied when the bridge, already referred to, was built, and trains admitted into the Central Station.

WEMYSS BAY STATION IN 1900, BEFORE RE-CONSTRUCTION.

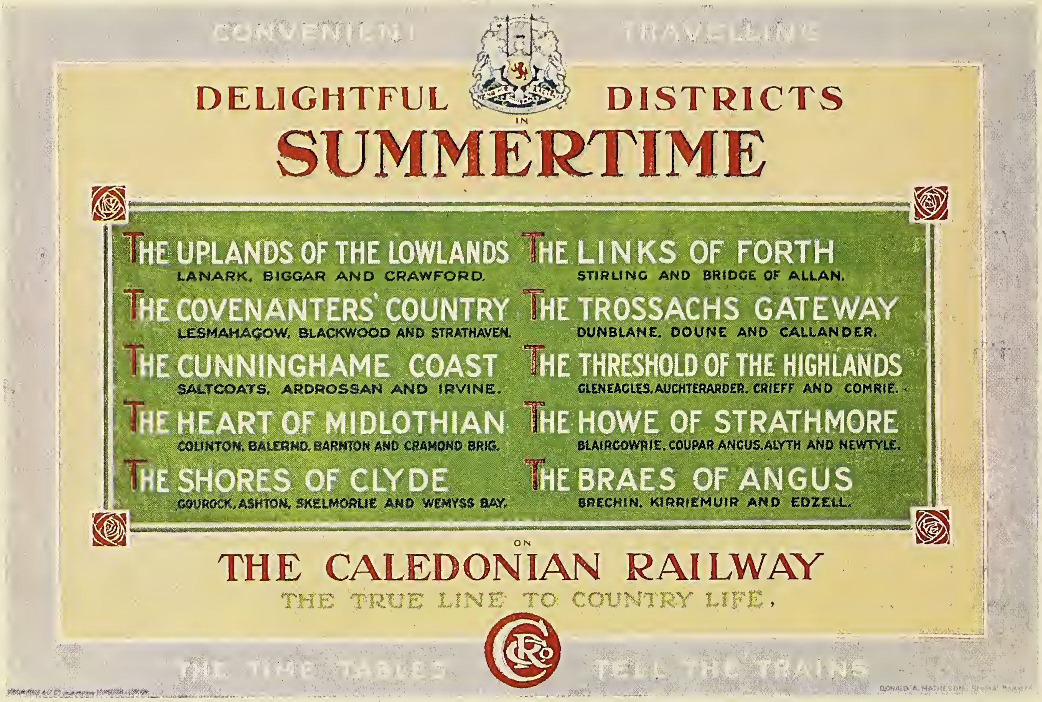
We have already said that to the ordinary tripper—at all events to the Saturday afternoon variety of the genus—Wemyss Bay is but a place where he exchanges train for steamer, or vice versa, and consequently he sees little but the station and pier until he is well on his way to Rothesay. The same thing may be said of Gourock, but Gourock exists not only for the pleasure seeker but for the business man, whereas Wemyss Bay has its principal clientèle in the summer tourist. The immediate objectives are Rothesay, Innellan, Dunoon, the Kyles of Bute, Tarbert, Ardrishaig, Inverary, and Oban. By a combination of rail, coach, and steamer, it is possible to arrange a visit to all that is worth visiting on the West Coast of Scotland, and, in fact, such ingenuity has been displayed in the dovetailing of times of arrival and departure, and in the selection of points of interest, that, if he desired, the tourist could exhaust the whole of the programme in the course of some three days.

The Scotch tourist is constantly on the move. A flat stretch of sandy beach, with a promenade and a band, suffice for the Southron when he goes away for his annual fortnight, but the Scot wants scenery. And, after leaving the Glasgow shipyards, there is little in Great Britain to compare with the succession of magnificent panoramas which meet the eye in whatever direction it be turned. Perhaps the favourite trip is that to Ardrishaig. One of Mr. David MacBrayne's splendid steamers leaves Wemyss Bay in the morning, immediately after arrival of the train from Glasgow, and after calling at Innellan and Rothesay, it proceeds round the northern part of the island of Bute, by what are called the "Kyles," or, in English, the "narrows," and thence by way of Loch Fyne to Tarbert and Ardrishaig. In the summer months an express steamer runs, or rather sails, not calling at intermediate ports, and reaches its destination in 2 hours 10 minutes. After a stay of 1¾ hours the journey back is made in the same way, and the day return from Glasgow is but 4s. 9d. Inverary furnishes another delightful trip, and on this line the two magnificent turbine steamers are employed. Incidentally Arran is included, for a call is made at Loch Ranza, at the extreme north of the island. Campbelltown is reached in 2¾ hours, after leaving Wemyss Bay, and a ride by coach across Kintyre, brings the tourist to Machrihanish, where the Atlantic can be seen at its best, or as some might say at its worst, the exact expression used, depending whether one was safe on shore looking at it, or out in the thick of it. What the Atlantic can do under favourable conditions, is apparent from an inspection of the deeply serrated coast line.

The steamer connections from Ardrossan and Gourock, are more important than those from Wemyss Bay. By way of Ardrossan, a week-end ticket to Douglas can be had for 7s. 6d. Here again is a pleasant Saturday to Monday trip, all for 11s. 6d. Leave Glasgow at 8.45 for Gourock, thence by *Lord of the Isles*, through the Kyles of Bute to Inverary, arriving at 1.30. On the return leave Inverary by ferry to St. Catharine's, thence by coach to Lochgoil Head, whence steamer to Gourock, and Glasgow arrive at 6.37. Somewhat more ambitious is a one day trip for 13s. 6d., involving an hour and a half by rail, four hours and a half by coach, and two and a half hours by steamer. The itiniary is as follows:

			a.m.
	Glasgow (Central)	leave	8 45
	Gourock	arrive	9 28
Str.	Gourock	leave	9 30
	Dunoon	arrive	9 45
Cch	Dunoon	leave	10 0
	Inverchapel	arrive	11 20
Str.	Inverchapel	leave	11 30
	Locheckhead	arrive	12 10p
Cch	Locheckhead	leave	12 15
	Strachur	arrive	1 10
			p.m.
Coach.	Strachur	leave	1 30
	St. Catherines	,,	1 55
	Hell's Glen	,,	3 0
	Lochgoilhead	arrive	3 50
Str.	Lochgoilhead	leave	4 0
	Gourock	arrive	5 35
	Gourock	leave	5 45
	Glasgow (Central)	arrive	6 37

* * *



CONVENIENT TRAVELLING

DELIGHTFUL DISTRICTS IN SUMMERTIME

THE UPLANDS OF THE LOWLANDS
LANARK, BIGGAR AND CRAWFORD.

THE COVENANTERS' COUNTRY
LESMAHAGOW, BLACKWOOD AND STRATHAVEN.

THE CUNNINGHAME COAST
SALTCOATS, ARDROSSAN AND IRVINE.

THE HEART OF MIDLOTHIAN
COLINTON, BALERNO, BARNTON AND CRAMOND BRIG.

THE SHORES OF CLYDE
GOUROCK, ASHTON, SKELMORLIE AND WEMYSS BAY.

THE LINKS OF FORTH
STIRLING AND BRIDGE OF ALLAN.

THE TROSSACHS GATEWAY
DUNBLANE, DOUNE AND CALLANDER.

THE THRESHOLD OF THE HIGHLANDS
GLENEAGLES, AUCHTERARDER, CRIEFF AND COMRIE.

THE HOWE OF STRATHMORE
BLAIRGOWRIE, COUPAR ANGUS, ALYTH AND NEWTYLE.

THE BRAES OF ANGUS
BRECHIN, KIRRIEMUIR AND EDZELL.

ON THE CALEDONIAN RAILWAY
THE TRUE LINE TO COUNTRY LIFE.

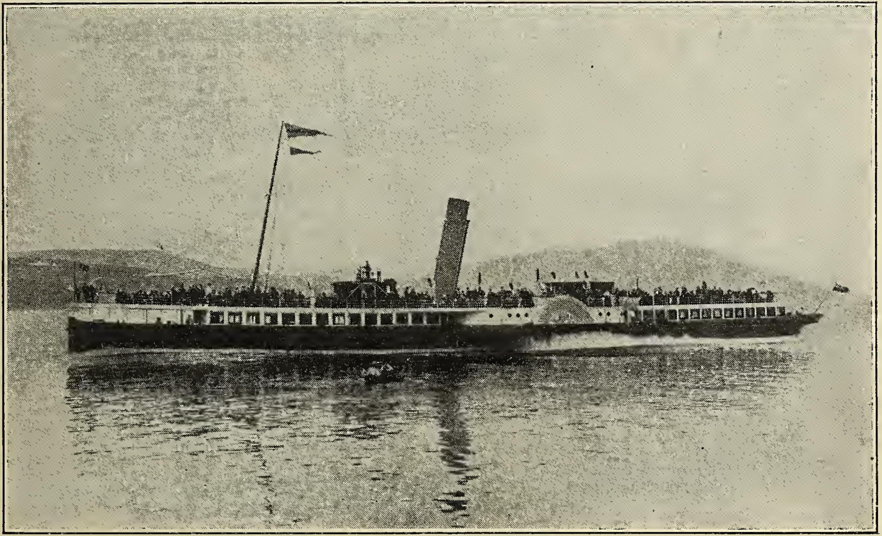
THE TIME TABLES TELL THE TRAINS

THE CALEDONIAN RAILWAY'S PROSE POEM POSTER, DESCRIBING SOME "DELIGHTFUL DISTRICTS IN SUMMERTIME."

A Paddle Wheeler in War and Peace.

The Caledonian (Railway's) Steam Packet Company has again in service the well-known and favourite *Duchess of Rothesay*. We illustrate on page 412 this paddle steamer on war service as a mine sweeper, and on this page the same vessel after being reconditioned and performing her regular passenger service to Clyde coast resorts.

The overhaul included the construction of new decks, new deck-houses and deck machinery, and also new boats and davits. The propelling machinery was also opened up and thoroughly overhauled. The first-class saloons have been reconstructed and finished in polished mahogany, the roof and side panels forming a chaste contrast in flat white with gold lining. A tea-room has been added for the comfort of passengers.



THE CALEDONIAN STEAM PACKET COMPANY'S PADDLE STEAMER *Duchess of Rothesay*, AFTER RE-CONDITIONING, AND NOW RUNNING TO CLYDE COAST RESORTS.

A few weeks back the *Duchess of Rothesay* ran trials on the Clyde, and in the course of the tests attained a speed of 18.32 knots.

The war record of the *Duchess of Rothesay* is to be found on a brass plate which has been fitted on board the vessel. The plate bears the following inscription: "P.S.—*Duchess of Rothesay,* employed as a mine-sweeper during the war, 1915-19. War service record: Towed Zeppelin 'L 15' to Margate Beach, April, 1916. Assisted in the salving of 14 vessels, swept up and destroyed over 500 German mines. Reconditioned by Messrs. Barclay, Curle and Co., Limited, Clydeside Repair Works, Govan, 1920."

* * *

RTM. JUNE 1920.

June 1919

Photo.] **NORTH BRITISH RAILWAY.** [*F. Bell.*
Edinburgh-Hyndland Train near Forrestfield. 4-4-0 Locomotive No. 734.

Some Curious Scottish Train Services.

By **C. C. LITTLEJOHN.**

IT would probably be hard to find a stranger railway anomaly than that of a mineral line, over which the owning company runs no passenger trains whatever, forming part of a rival Company's main line, and over which the latter exercises running powers for all descriptions of trains from the "Postal, Limited," downwards. This curious state of affairs exists a mile or two north of Coatbridge, where a North British mineral line from Sunnyside Junction to Garngaber Junction is made use of, for a distance of 52 chains between Gartsherrie Junction and Garnqueen South Junction, by all Caledonian trains to and from the north. It thus forms part of the "West Coast Route" to Aberdeen, and is traversed by a number of through Caledonian expresses daily, as well as by "locals" from Coatbridge to Glenboig and back; but no North British passenger trains of any kind use it.

Strangely enough, the position of the two companies is reversed not many miles further north, as two short sections of the Caledonian Railway may be found which are now used by passenger trains of the North British Railway. The first instance is the line, 60 chains in length, which connects the Caledonian Railway main line at Greenhill with the adjacent Edinburgh-Glasgow main line of the North British Railway. Until the end of 1869, Caledonian trains between Glasgow and the north ran over the North British Railway from and to Glasgow (Queen Street) *via* Greenhill, but the connecting line here is now used exclusively by North British running power trains from Glasgow (Queen Street) to Larbert, Alloa, and Stirling, and to Grangemouth direct *via* Falkirk (Camelon), and *vice versa.* The last-mentioned service comprises three trains daily each way at the present time, and these traverse the other short section of Caledonian "metals" no longer used for passenger traffic by the owners. This is the spur, 38 chains in length, between Carmuirs West and East Junctions. In normal times, one Caledonian passenger train ran daily from Greenhill to Grangemouth with through carriages from Glasgow (Buchanan Street) and *vice versa,* but these were discontinued when the restricted war services came into force, and connections between

Buchanan Street and Grangemouth are now made *via* Larbert. It may be mentioned here that neither Caledonian nor North British trains from Glasgow to Grangemouth can complete their journey without exercising running powers over the other's lines; this also applies to passenger trains of either company between Larbert and Alloa.

A curious journey of about a dozen miles from start to finish, which necessitates the engine "rounding" its train at two different points *en route*, although in neither instance at a station, may be found in the current Caledonian timetables. Daily, except Saturdays, a workmen's train leaves Lanark at 5.30 a.m. for the out-of-the-way passenger terminus at Coalburn, and a glance at a railway map of the district reveals the fact that the journey is a distinctly awkward one. The first "reversal" takes place at Poniel Junction, between Douglas and Douglas (West) stations, where the Muirkirk section is left, and the train proceeds northwards to Alton Heights signal-box, 2 miles 34 chains from Poniel. This is the junction of the old and new Lesmahagow lines with the Coalburn branch, and the second "reversal" is rendered necessary here, Coalburn being ultimately reached at 6.23 a.m. A corresponding return train leaves Coalburn at 3.15 p.m. for Lanark, and is combined at Alton Heights with a portion which leaves Brocketsbrae at 3.20 p.m. The county town is reached at 4.14 p.m., after twice reversing, as on the outward journey. Passengers who desire to proceed beyond Lanark require to change trains, and as the station is a terminus, it is left in the same direction as it is entered from. In order to reach Wishaw, or any other station in the north, yet another "reversal" becomes necessary at Carstairs—the fourth since leaving Coalburn, and sufficient, surely, to confuse even the most level-headed traveller as to the direction in which he is ultimately proceeding! In addition to these workmen's trains between Lanark and Coalburn, an ordinary passenger train leaves Brocketsbrae at 9.7 a.m. (8.28 a.m. ex Hamilton Central) for Lanark, returning from the county town at 11.30 a.m., but on both journeys it proceeds westwards from Poniel Junction to Douglas (West), at which station the engine "rounds" its train. On Saturdays, however, an extra train leaves Brocketsbrae at 2.37 p.m. for Lanark, which "reverses" at Poniel Junction.

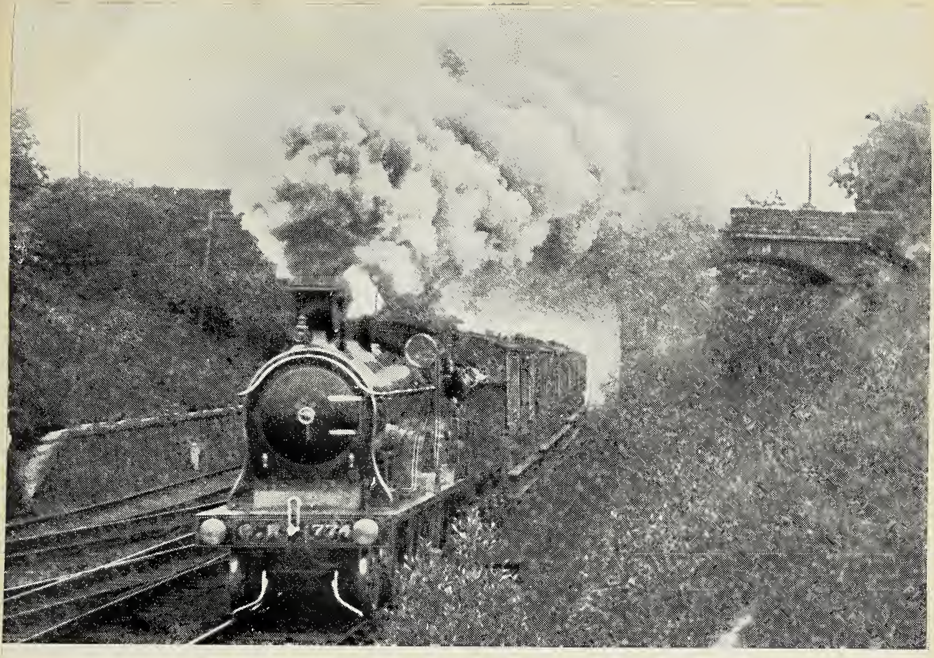
While on the subject of journeys entailing "reversals," mention may be made of another example to be found on the Caledonian Railway at present. This is the 5.40 p.m. train from Bankfoot to Perth, *via* Stanley, the engine of which "rounds" its train twice on the short journey, but in each case at a station. The Bankfoot Light Railway is 3 miles in length, and was for some time worked as an independent company, and a separate platform for the branch trains is provided at Strathord to the west of the Caledonian station proper. Physical connection is effected between the two systems by a junction between the light railway and one of the goods sidings whence trailing points lead to the down main line, and it is not possible for trains to run through from Perth to Bankfoot and *vice versa* without shunting into the siding first. In the case of the 5.40 p.m. from Bankfoot, the engine requires to "round" its train in addition, since the train in question makes an extra trip to Stanley Junction and back, and the method of working in this case may be briefly described. On arriving at the light railway platform at Strathord at 5.51 p.m., the engine "rounds" its train by means of the loop provided for this purpose, and thereafter draws the carriages in the direction of Bankfoot until they are clear of the points leading to the goods siding referred to. The train is then propelled into the latter, whence it draws forward on to the main line and again shunts back alongside the down platform of the Caledonian station. Seven minutes are allowed for the shunting operations, and at 5.58 p.m. it leaves for Stanley, 2 miles 6 chains north of Strathord. Passengers for Perth get this "extra" without any additional payment, as the train does not call at Strathord on its return from Stanley. On arriving at Stanley at 6.3 p.m. the train runs through the down line and shunts over to the up platform; the engine thereafter proceeds to "round" it again, and finally departs for Perth at 6.15 p.m., arriving at its destination at 6.32 p.m.

Two "reversals" are also rendered necessary on the North British Railway in the case of the 2.40 p.m. train from Fort Augustus to Corpach, the engine of which requires to "round" its train at Spean Bridge and Fort William respectively.

The North British Railway could also show a journey of a roundabout nature in its recent time-tables which, although hardly so curious as the Lanark-Coalburn service of the Caledonian already described, was interesting since the train in question traversed in the course of its short journey three different sections of line not otherwise used for ordinary passenger traffic, and in addition called at a semi-derelict station *en route*. Daily, except Saturdays, a train left Dunfermline (Upper) at 5.53 p.m. for Cardenden, which, instead of following the orthodox route by way of Cowdenbeath (New) (on the Edinburgh-Perth main line) ran by the old line from Cowdenbeath South Junction *via* Cowdenbeath (Old), and was the only passenger train available to the public which called at that station. Even then it did not proceed direct to its destination, but undertook another deviation northwards over a mineral line from Lumphinnans Central Junction to Kelty, rejoining the Perth main line at Kelty South Junction. The train was due to arrive at Kelty at 6.24 p.m., and after "reversing," departed at 6.35, running thence to Lochgelly direct by means of the spur between Lumphinnans North and East Junctions. The journey in all occupied 58 minutes instead of the customary half-hour for the distance of 10 miles by the direct route *via* Cowdenbeath (New). As the train was primarily run for the conveyance of workers, only third-class accommodation was provided, but it was discontinued as from March 31 last, and Cowdenbeath (Old) has disappeared from the time-tables in consequence.

Another "roundabout" service of the North British Railway is that given on Saturdays by the 12.7 p.m. train from Balloch, which runs to Milngavie *via* Queen Street (Low Level) and Springburn. After a wait of 7 minutes it leaves Queen Street at 1.14 p.m. and runs back non-stop to Westerton, at which station it has already called on its journey from Balloch, and thus gives a complete circle service from that station. Although it passes Maryhill it does not call there and the only train by which passengers can travel from Maryhill to the Milngavie branch leaves the former station at 7.48 a.m. Correspondingly the 7.45 a.m. from Milngavie to Queen Street (High Level) gives the sole local service in the day from Milngavie to Maryhill and Cowlairs, as well as between the two last-mentioned stations. This "restricted service" in the immediate neighbourhood of such a great city as Glasgow and such an important railway centre as Cowlairs is somewhat noteworthy.

An interesting Glasgow "roundabout" service is given on the Caledonian Railway by the 5.11 p.m. train from Central (High Level) to Burnside and Kirkhill *via* Mount Florida, as this train runs back non-stop from Kirkhill to its starting point *via* Carmyle and Rutherglen, and incidentally gives the sole passenger service of the day over the section between Kirkhill Junction and Westburn Junction. It leaves Kirkhill on the return journey at 5.34 p.m., and is due back in Central at 5.56 p.m., while another train which proceeds to the city *via* Mount Florida, making the usual stops, leaves Kirkhill at 5.35 p.m. and reaches Central at 5.59 p.m. —an example of a practically "simultaneous service" between two stations by widely divergent routes. Finally, until the end of January last, it was possible to travel by train without a change from the Low Level station at Glasgow (Central) to the High Level terminus directly above. The train in question was a through one from Clydebank to Central (High Level) *via* Carmyle, Kirkhill, and Mount Florida, and left Central (Low Level) at 7.47 a.m., arriving "upstairs" at 8.36 a.m. This curious service was, however, discontinued when the February time-table came into operation.



Photos] [*F. T. Budden*

Glasgow express near Carlisle about 1898, Caledonian Railway
McIntosh 4-4-0 locomotive No. 774

THE BEST RAILWAY RUNS OF 1904.

CALEDONIAN RAILWAY: EIGHT RUNS.

Runs Between	Miles.	No. of Runs.	Journey by Quickest Train.	Speed. Miles per hour.	Quickest Train.
			H. M.		
Carlisle and Perth	150¾	3	3 0	50.2	1.40 a.m. D. Commences July 19th.
Glasgow (Central) and Carlisle ...	103¼	3	2 10	47.6	10.0 a.m. U.
Edinburgh and Carlisle	100¾	2	2 3	49.1	10.15 a.m. U.

The fastest Carlisle–Perth run is 5 minutes slower than last summer, but there are now three such runs instead of one. The third train used to call at Stirling, 117¾ miles from Carlisle, whereas it now only stops there conditionally. From "Bradshaw" it would appear as though several more trains run between Carlisle and Edinburgh and Glasgow without a stop; but these really halt at Strawfrank Junction, outside Carstairs, to detach or attach a Glasgow or Edinburgh portion, as the case may be

100 Mile Runs in 1907.

Caledonian Railway (Nine Runs). [8]

Between	Miles.	No. of Runs.	Journey by Fastest Train.	Speed Miles per Hour of Fastest Train.	Fastest Train.
			H. M.		
Carlisle and Perth	150¾	3	3 0	50·2	1.40 a.m. D.*
Stirling and Carlisle	117¾	1	2 39	44·4	10.46 p.m. U.
Carlisle and Glasgow (Central) ..	102¼	3	2 4	49·2	5.46 a.m. D.
Carlisle and Edinburgh (Princes Street)	**100¾**	2	**2 0**	**50·3**	**5.35 a.m. D. 10.15 a.m. U.**

* The down trains from Carlisle to Perth, Glasgow, and Edinburgh usually stop at Beattock for the locomotive to take water, or at summit to detach a pilot, so the non-stop runs to Perth are frequently only 111 miles or 101¼ miles in length; whilst when a stop is made, the runs to Glasgow and Edinburgh are under 100 miles in length.

Aug 1911

New Travel Facilities on the Caledonian Railway.

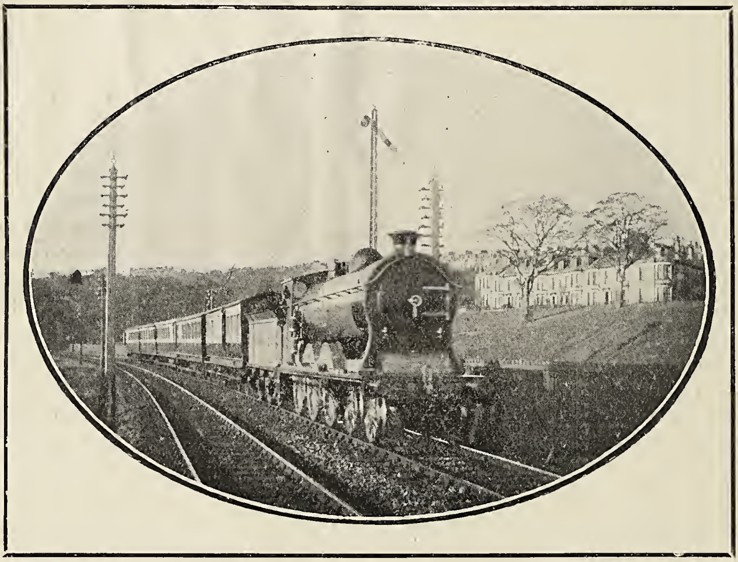
EACH year the City Man in all parts of the United Kingdom realises more and more the advantages of being able to reside as far removed from his place of business as possible. Many railways recognize this, and meet the demand by running express trains to suit business hours for what may be termed '*outer* outer suburban services.' Nor do we find the Scotch Railways behindhand in these matters.

The Caledonian Railway is fortunately situated with regard to residential resorts, and serves a large variety of charming spots, both on the coast and inland, in which the business man of Glasgow and Edinburgh may reside, and yet be within daily reach of 'town.'

Such places as Bridge of Allan, Dunblane, Callander, Crieff, etc., have been fostered by the Caledonian Railway, to which line they owe not a little of their popularity. This year the train services to these and other places have been further improved, new trains being run, commencing on May 1st instead of July, so that patrons of the Caledonian Railway will have two additional months of summer services.

In the first place, the Crieff and Auchterarder districts will no longer share their trains with the Dunblane and Callander services, but will revel in the —luxury we were going to call it, but it is more of a necessity nowadays—service of non-stop and express trains entirely their own. The most important train is the present 8.18 a.m. from Crieff. Leaving Crieff three minutes earlier, at 8.15 a.m., and Crieff Junction one minute earlier, at 8.39 a.m. (at which latter place passengers by the 8.0 a.m. *ex* Perth can join the train) the stops between Crieff Junction and Larbert will be eliminated. At Larbert a stop will be made for ticket collecting and the detaching of the Edinburgh portion. Glasgow will be reached at 9.45 a.m., instead of 10.5 a.m. as at present, a saving of twenty minutes, while on the Edinburgh run the 'Modern Athens' will be reached at 9.55 a.m. This train will be known as the 'Strathearn Express.' On the return journey a train will leave Princes Street Station (Edinburgh) at 4.50 p.m. At Larbert it will join the 5.0 p.m. from Buchanan Street to Dundee and Aberdeen, which will not stop between Larbert and Perth, except at Auchterarder and Dunning, and at Crieff Junction to detach the Crieff portion, which will reach Crieff at 6.35 p.m. The "Strathearn Express" will return from Buchanan Street, Glasgow, at 4.35 p.m., calling only at Crieff Junction at 5.38 p.m., and reaching Crieff at 6.0 p.m.

On Saturdays the "Strathearn Express" will leave Glasgow (Buchanan Street) at



Photo] [*Mr. Tom M. L. Neish.*

1 P.M. *ex* PERTH NEAR BUCKINGHAM JUNCTION; DRAWN BY 4-6-0 LOCOMOTIVE NO. 908.

1.10 p.m., and Edinburgh (Princes Street) at 1.0 p.m., the respective portions joining up at Larbert. The train then runs forward to Bridge of Allan, Dunblane and Crieff Junction, and reaches Crieff at 2.50 p.m.

The 'Strathearn Express' is not of course the only fast train serving Crieff. Amongst the others which are convenient for business men is the 7.15 a.m. from Crieff, calling at Crieff Junction at 7.34 a.m. Glasgow is reached by this train at 8.57 a.m. and Edinburgh (Waverley) at 9.45 a.m. In the evening the residents in the bracing Crieff districts will be able to avail themselves of the trains leaving Glasgow at 4.0 and 4.45 p.m. and Princes Street, Edinburgh, at 4.25 p.m. as at present.

Photo] [Mr. Tom M. L. Neish.

PERTH-DUNDEE TRAIN ENTERING MAGDALENE GREEN STATION; HAULED BY 0-6-0 LOCOMOTIVE NO. 824.

Of course, the Auchterarder and Crieff districts do not appeal solely to those whose business is conducted in the 'city of ships and engineering' and the 'City of the Seven Hills.' Perth and Dundee are large commercial centres, and claim the working hours of many of the occupants of these delightful resorts. The Caledonian Railway is therefore providing additional facilities for this section of its passengers.

The 8.40 a.m. through express from Crieff will be accelerated to reach Perth at 9.13 a.m., five minutes earlier than usual, and the Dundee timing will also be altered, the arrival at the latter place being at 9.56 a.m. The return train from Dundee will leave at 4.30 p.m. daily, except Saturdays, and on Saturdays at 1.40 p.m. In addition to this, a new express connection from Perth to Crieff, leaving at 5.45 p.m., Saturdays excepted, will be made with the 5.0 p.m. from Dundee.

So far we have dealt solely with the Crieff trains. The 7.40 a.m. Buchanan Street to Dundee corridor express will this year call at Auchterarder at 8.50 a.m., reaching Dundee at 9.56 a.m. A new train will leave Perth at 7.15 p.m. for Auchterarder and Crieff Junction, whilst this summer the 7.0 p.m. Dundee-Glasgow express will call at Crieff Junction. The usual excellent and convenient summer arrangements will come into force on the Dundee, Newtyle, Alyth and Blairgowrie section.

Kirriemuir, being very popular as a summer residential resort with Dundee business men, is to have a new train leaving at 8.45 a.m., calling at Forfar and Monikie, and arriving at Dundee East in the even hour. In the opposite direction a new train will leave Dundee East, Saturdays excepted, at 5.10 p.m., calling at Monikie and Forfar, and reaching Kirriemuir at 6.5 p.m., whilst on Saturdays only the departure from Dundee East is timed for 1.30 p.m.

Brechin and Montrose are two busy centres which are to benefit by improved services. The Elysian retreat in this case is Edzell, whose health-giving air and picturesque surroundings lure many city-dwellers to the North Esk. Many important accelerations and alterations will be made in the train service, chiefly in the direction of running through trains as far as possible. The inconvenience of the change of carriages at Bridge of Dun or Dubton Junction will thus be avoided.

The Granite City is not to be left in the cold. Aberdonians can secure for themselves both seaside and country attractions by migrating for the summer to Stonehaven, whence a new train will leave for Aberdeen at 10.15 a.m., and the 8.45 a.m. train, which proved so popular last season, will be re-introduced. The present 8.55 a.m. train will be accelerated to reach Aberdeen at 9.30 a.m. The daily running of the 8.20 p.m. from Aberdeen, which started at 8.15 last summer, will also be resumed on June 1st, so that it will be seen that, with the present excellent service, Aberdeen will be well served during the coming season.

The 'Upper Ward' of Lanarkshire is too well known to the majority of our readers to need much comment. 'Good wine needs no bush,' and the whole of this district is famed far and wide for its beauty and charm. Particularly is it attractive to Glaswegians and citizens of Edinburgh as a neighbourhood in which the cramped spaces of the city or suburbs may be forgotten, at least for a while. This year, so popular has the district become as a permanent residence, the Caledonian Railway purpose commencing the express business services a month earlier than usual, viz. on the 1st of May.

Photo] [*Mr. Fred A. Neish.*

WEST-BOUND TRAIN CROSSING KINGORDIE QUARRY; DRAWN BY 4-4-0 LOCOMOTIVE NO. 149.

Included in these services is a new train from Moffat at 7.45 a.m., calling at Beattock, Crawford, Abington, Symington and Thankerton, and arriving at Glasgow Central at 9.30 a.m. A connection for Edinburgh arrives at Princes Street Station at the same hour, 9.30 a.m. The 1.20 p.m. 'Saturdays only' train from Glasgow Central will be re-timed to reach Peebles at 3.8 p.m. and Moffat at 3.11 p.m. The 8.40 a.m. express from Lanark to Glasgow again makes its appearance, as does the 5.0 p.m. Glasgow—Lanark. The 6.35 a.m. from Crawford will start from Crawford daily at 6.55 a.m., calling at all stations to Carstairs, and daily, except Mondays, will run forward to Law Junction, make a connection there with the 7.55 a.m. *ex* Lanark, due Glasgow at 8.55 a.m. On Mondays, when it will run through as last season, independently of the Lanark express, it will be due in Glasgow at 8.33 a.m.

East Kilbride and Busby are also to benefit by an improved service, many of the trains now terminating at Busby running forward to East Kilbride, intermediate calls being dispensed with on certain trains, 'local' trains being run to complete the service. On the Clyde-coast lines a new late train will leave Wemyss Bay station at 8.35 p.m., connecting at Port Glasgow with the 9.20 p.m. train from Gourock to Glasgow. A return connection will be made off the 8.30 p.m. train *ex* the Central Station, Glasgow, leaving Port Glasgow at 9.16 p.m. Eight new trains will run in both directions between Port Glasgow, Greenock, Fort Matilda, and Gourock, which will convert the service into what will to all intents and purposes be a 'bus service. Nearly forty trains each way will then be running between these places locally, in addition to the through connections.

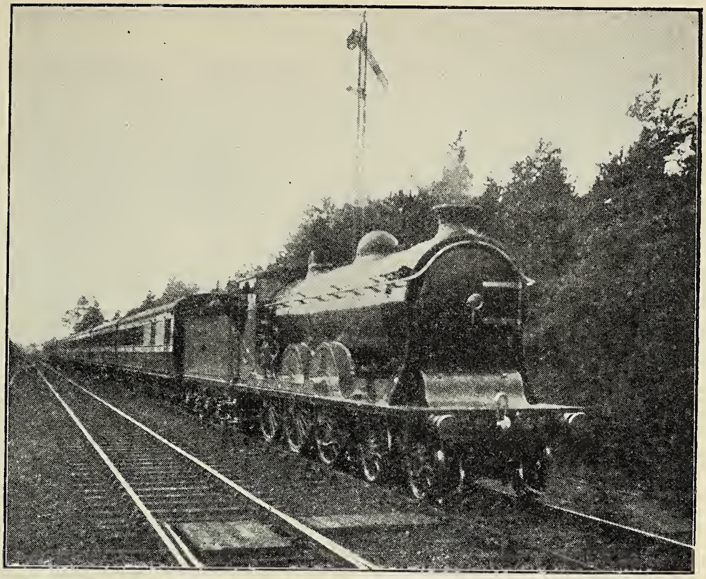
It will be seen that this summer Mr. Donald A. Matheson, the new General Manager of the Caledonian Railway, ably seconded by his experienced Superintendent of the Line, Mr. T. W. Pettigrew, has liberally catered for the business man residing at a distance from the city in which he toils. Mr. Matheson can be credited with much foresight in holding out these inducements—express trains at business hours, and more frequent trains, etc.—to the busy man, to the end that the worker in the city may have the opportunity of residing with his family in some of the most charming resorts in Bonnie Scotland.

Jan: 1914

Caledonian Railway Impressions.

By

J. F. GAIRNS.



Photo] [*J. Cheyne.*

10 A.M. GLASGOW-ABERDEEN EXPRESS PASSING GLAMIS :
4–6–0 locomotive (6 ft. 6 in. class, Schmidt superheater) No. 905.

As the northern partner in the West Coast combination the Caledonian Railway is an important factor in Anglo-Scottish railway inter-communication, and is further notable in that, as regards traffic passing by the West Coast route, it is the active agent from the border station—Carlisle—to all places beyond, whether for Glasgow, Edinburgh, Perth, Dundee or Aberdeen, or destined for the Highland, Great North of Scotland and Callander and Oban Railways.

Most southerners make their first acquaintance with the Caledonian Railway at Carlisle, perhaps the most interesting station in the Kingdom, though at times, between the periodic rushes of traffic, it can only be described as " deadly dull." Here, between 4 and 6 a.m., 12 noon and 1.30 p.m., 3.30 and 4.30 p.m., 8 and 11 p.m., and 1 and 2.30 a.m., may be seen train after train belonging to the various companies which use the station, all except those of the North Eastern and Maryport and Carlisle Railways, and a few local and secondary trains, involving a change of engines and handing over by one company to another. Of these trains the larger proportion are " horsed," for Scottish working, by the famous blue engines ; and at all periods are to be seen the most interesting locomotives included in Caledonian equipment. " Dunalastairs " of the second series, the 900 class and the 140 and corresponding superheater designs provide an interesting array of 4–4–0 locomotives, nearly all taking trains which are fast (both relatively and actually) and heavy, while Nos. 49 and 50 and Nos. 903 to 907 add further interest as representatives of the 4–6–0 type. Other classes, except perhaps an occasional tank engine working one of the very few short distance locals, and goods engines in the adjacent goods station, are very exceptional.

Leaving Carlisle with the smartness characteristic of most Scottish locomotives the run to Beattock is usually made in good time, and here, unless double-headed from Carlisle, a stop is made for water and to attach a banking engine—generally a 0–4–4 tank engine—by means of a slip coupling. Instances are on record of the ascent of the famous bank being made without assistance and with substantial loads ; but they have never come within the writer's experience. The bank is usually climbed in good style, and the ascent provides much that engages the attention, this part of the line being very picturesque though the country is comparatively desolate. At the summit a stop is made by double-headed trains to detach the pilot and for water, but banked trains continue without stopping, the assisting engine being " slipped " and dropping behind.

Fast running is then made on the other

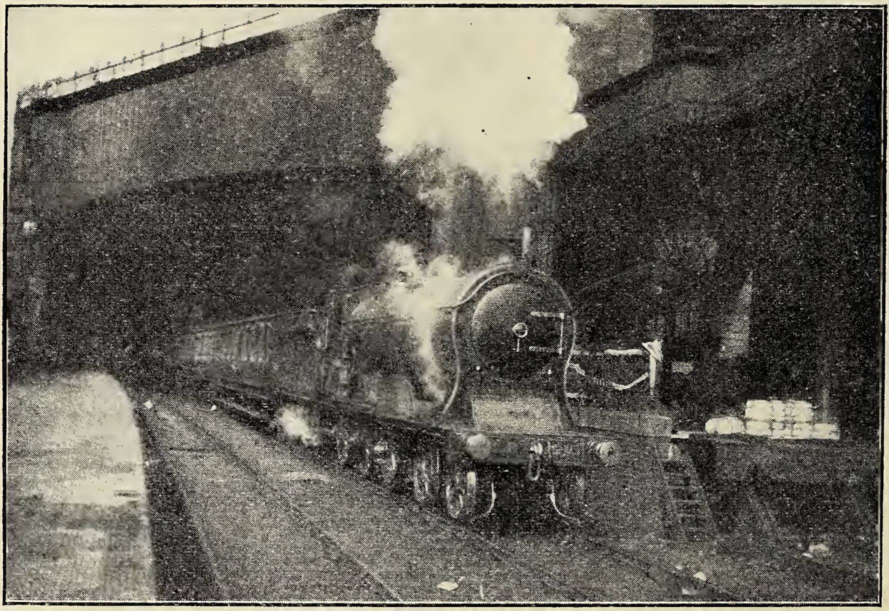
side, until Carstairs is reached, either for stopping there or at Strawfrank Junction outside, or in order to traverse the curves slowly. The train working here is somewhat curious, as the Edinburgh portion may be detached outside and taken on by an engine attached in front, or uncoupled in the station and taken out by an engine in the rear. Occasional divisions at Symington add further diversity to the methods in force.

Approaching Law Junction and Wishaw the industries of the Glasgow district take the place of scenic attractions, but the surroundings of the line, whether journeying to Glasgow or diverging towards Stirling and Perth, continue to be interesting, industrially if not scenically. As for the railway complications of this area it is best not to say too much. It requires a resident to appreciate them fully, and it is necessary to confess that the writer has not yet been able to understand the railway geography of this area except in a superficial manner.

Southbound the journey from Glasgow is principally characterised by heavy pulling, usually without assistance, nearly all the way to Beattock summit. The impression conveyed is that it is really much harder than from Carlisle, the latter having the gradient difficulties largely concentrated in Beattock bank, while southbound engines have collar work for nearly half the journey.

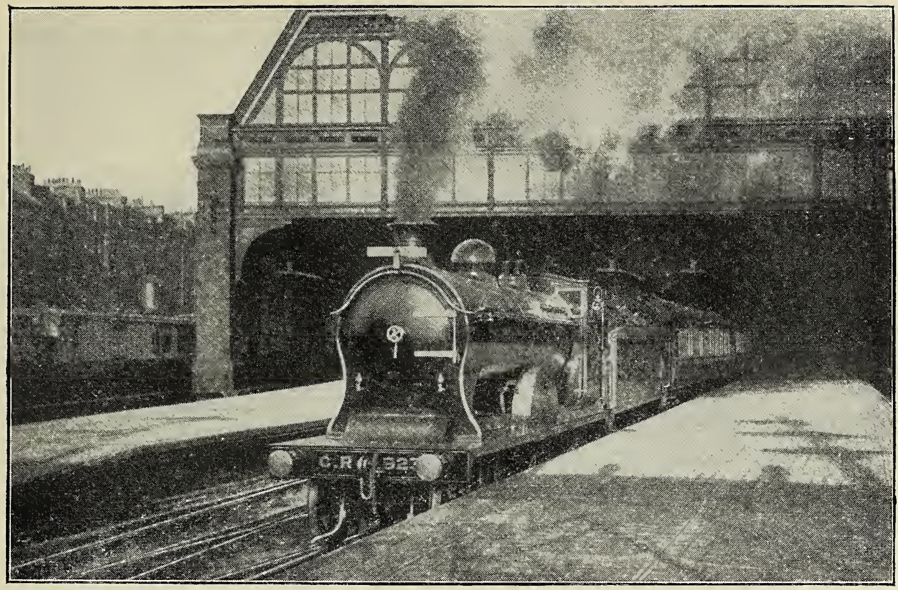
There are few finer stations than Glasgow Central, with its wide circulating area, and spacious platforms. Here are to be seen engines of all classes. Large 4–4–0 locomotives on the standard main line trains, with a few 4–6–0's on specific services; the first "Dunalastairs," with a few older locomotives of rebuilt classes on the Edinburgh expresses, and the same engines with the addition of the 5 ft. 9 in. 4–6–0 mixed traffic and some of the 0–6–0 goods engines (with and without superheaters) on the Clyde coast services operated mainly at the further platforms on the arrival side; tank engines—0–4–4 type, with 4 ft. 6 in. and 5 ft. 9 in. coupled wheels—on the Cathcart Circle and general local services dealt with in the centre of the station, with a sprinkling of black ones fitted with condensing apparatus to lend variety; and a few of the old outside cylinder 2–4–0 and 0–4–2 locomotives on suitable duties or acting as shunters.

Rolling stock to be seen here includes all classes of vehicles, from the magnificent West Coast Joint Stock and the set trains used for Edinburgh–Glasgow traffic and for the principal coast services, to the older bogies, six-wheelers and four-wheelers (some of the last mentioned painted very dark blue) which still take a share in the suburban traffic. The question may be raised whether any other company does



Photo] [*G. Boyd Hutchinson.*

CLYDE COAST EXPRESS LEAVING GLASGOW (CENTRAL): 4–6–0 ENGINE (5 FT 9 IN. CLASS) No. 913.



Photo] [D. McBean.

LONDON EXPRESS LEAVING PRINCES STREET, EDINBURGH: 4–4–0 LOCOMOTIVE, NO. 923.

so much in the way of allocating sets of vehicles to particular services as does the Caledonian. In addition to the main line sets there are block trains of eight and twelve-wheelers not only reserved but permanently lettered for the Edinburgh–Glasgow, Glasgow–Gourock, Glasgow–Wemyss Bay and other specified routes. Some of these, though ranking as expresses and taken by express engines, work to and fro in the manner usually associated with suburban traffic; an engine being attached in rear shortly after arrival ready for the next journey on the route to which the trains belong. Many of these special trains are fine examples of the carriage-builders' art, and are well worthy of examination, besides being comfortable for travelling.

The coast services of the Caledonian Railway afford an absorbing study. They are numerous and many are timed very smartly in view of the gradients and traffic difficulties. Most of the principal trains run in connection with the steamers, which may almost be said to constitute extensions of the railway to places along the Clyde estuary necessarily inaccessible by rail. Two records of runs with these trains may be briefly referred to.

A goods engine with a load of 9 ordinary bogie coaches was working the 8.30 a.m. out of Glasgow Central. Starting very smartly, Paisley (Gilmour Street) was passed at slightly reduced speed in 11 min. (7¼ miles), and good running brought us to Port Glasgow, the first stop, in 27¼ min. (20¼ miles). High speed is difficult beyond owing to curves and other hindrances, but the remaining 6 miles to Gourock were covered in barely 11 min., the complete run of 26¼ miles having been made, with one stop of 40 sec., in 38 min. 40 sec. On a return train booked to call at Paisley only, No. 723 (4–4–0, first "Dunalastair" class) had 5 twelve-wheelers and 3 eight-wheelers. The earlier stages are very difficult, 9 min. 25 sec. being required to pass Greenock Central, but onwards to the Paisley stop the 15½ miles were covered in barely 20 min. The remaining 6¼ miles to Pollokshields, start to stop, occupied barely 10 min.

One can hardly call this route scenically inviting and it is not so attractive as the Glasgow and South Western route to Greenock with its magnificent climb over the hills above Port Glasgow, but there is much to be seen on the way, especially as one follows the riverside. It is, however, when one travels by Caledonian steamer down the Clyde that one appreciates the attractions which the famous Firth has for Glaswegians. This phase will be further dealt with on another occasion. Mention may be made, however, of the fact that personal inspection entirely concurs with the generally expressed opinion that Wemyss Bay station is one of the

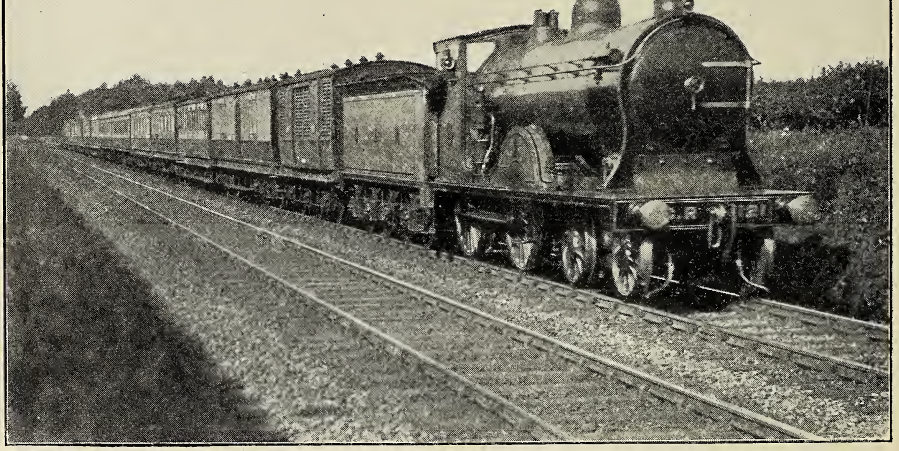
Photo] [R. A. Chrystal.

EXPRESS LEAVING STIRLING : 4-4-0 LOCOMOTIVE NO. 778.

prettiest and most attractive stations of its class in the Kingdom.

Buchanan Street station suffers considerably by comparison with Glasgow Central as regards architecture and arrangement, but it is really a terminus of an altogether different character and must be appraised on a distinct basis. Princes Street, Edinburgh, is on the other hand a worthy companion to the principal Glasgow terminus. Many of the smaller stations on the Caledonian are also of interest in various ways.

North of Glasgow, whether the main line is reached from Buchanan Street or *viâ* the local lines from the Central station, or direct from the south, through the complicated Holytown and Wishaw area, there is considerably industrial interest, until the country becomes more or less agricultural. At Larbert, Stirling and Gleneagles inter-connecting trains are met with ; but it is at Perth that the complexities of traffic are most apparent. Here the Caledonian, North British and Highland Railways, each with its own goods yards, engine sheds, etc., are



Photo] [F. E. Mackay.

PERTH–EUSTON EXPRESS NEAR FLORISTON:
Superheater locomotive No. 121.

Photo] [*J. Cheyne.*

10.5 A.M. ABERDEEN–LONDON EXPRESS PASSING GLAMIS: 4–4–0 LOCOMOTIVE NO. 926.

brought into association. The connections with the principal Highland services render the station a busy one at certain periods of the day, particularly from 4.30 to 6.30 a.m., 11 a.m. to 1 p.m., 3 to 6 p.m. and 7 to 8.30 p.m. Engine changing and interchange of trains between the respective companies, as well as the traffic of the station itself, create many outstanding features. In the early morning the arrivals of the Highland sleeping car trains from London are well worthy of watching, and their departure is usually associated with a considerable amount of excitement, particularly during the summer months and when traffic is very heavy. Then comes the postal train, with its attendant transhipment of mails. Later in the day the connections and inter-connections are more comprehensive.

North and east of Perth there is less of special note until Aberdeen is reached; but at the joint station in the "Granite City" complex inter-connecting and terminal traffic is involved, the Caledonian, North British and Great North of Scotland Railways being here associated. The "Grampian" and "Granite City" trains provided by the Caledonian Company for the Aberdeen traffic are composed of splendid vehicles, and well maintain Caledonian characteristics in the northern area. On this section the large 4–4–0 locomotives of the 140 and superheater classes are mainly in evidence, with some of the 5 ft. 9 in. and 6 ft. 6 in. 4–6–0's, but relatively few trains travel long distances without stopping, though the intermediate schedules are in several instances very tight. Scenically the concluding section from about Stonehaven appeals strongly to the visitor, the rocky coast and other natural features being very impressive.

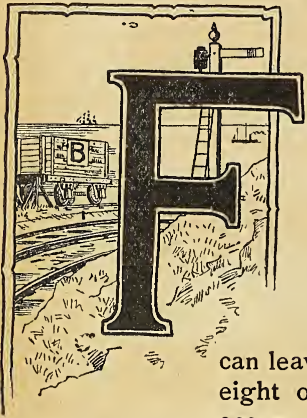
Much could be said in reference to the Callander and Oban line and various branches and the subject will receive further attention at a subsequent date; but for the present it may be said that one's impressions of the Caledonian Railway are distinctly favourable. The sportsman, the angler and the tourist are well catered for by the "True Line." The railwayist is provided with abundant subject matter for observation, and as a rule he will leave the Caledonian Railway with the intention of revisiting it at an early opportunity.

Dec. 1899

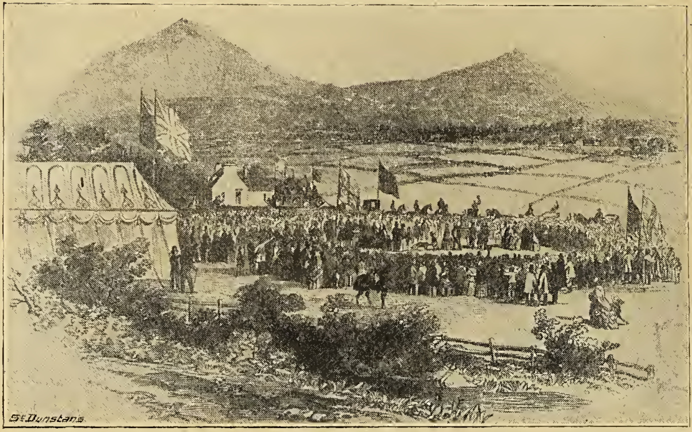
A RAILWAY JOURNEY FORTY YEARS AGO

By J. S. Stuart

Accountant and Treasurer, Great North of Scotland Railway



FROM Aberdeen to London is a distance of about 540 miles. At the present day it is a delight to make the journey. One can leave Aberdeen at eight o'clock at night, occupy a magnificently furnished bedroom, go to sleep in a luxurious bed (that is, if the swing and jolt of the carriage and the lullaby of the rattling wheels *can* let one sleep), and get a comfortable wash, and arrive quite fresh and fit for immediate work in London next morning at eight o'clock. Some people say they can even shave themselves in the train. I once tried it, but I shall not do it again, unless I have a good supply of sticking plaster, or wish to pose as a German student.

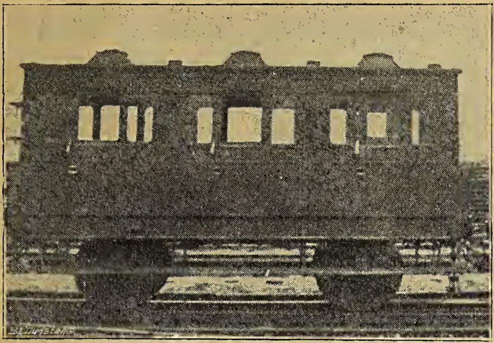


CUTTING THE FIRST SOD OF THE GREAT NORTH OF SCOTLAND RAILWAY, AT WESTHALL, IN 1852

It was not ever thus. In my young days, if you did not go by sea in a sailing smack — when it depended on the wind whether the voyage was to take a week or a month —you had to travel by the stage coach, which took the best part of five days to accomplish the journey. However delightful was the feeling of sitting behind four spanking bays, listening to the occasional strains of the red-coated guard's trumpet, and enjoying the fresh balmy breezes, it was apt to become monotonous. And if the weather was wet, your state of mind became perfectly miserable, which was not in any way relieved by the sight of the muzzle of the guard's blunderbuss, which always showed itself protruding from the mouth of his wicker case, seeming to suggest that it might at any moment be called into requisition. Indeed, it is said that a journey to London in those days was considered so dangerous that people before they made it took the precaution to make their wills.

But the advent of railways changed all that, although in their early days a journey by them, both in regard to comfort and speed of travelling, compared very unfavourably with one in the present day. To bear out this let me give you the details of a trip I made from Aberdeen to London in 1862 to visit the great exhibition of that year.

"Tempted by a ridiculously low fare—it was only 20s. third class to London and back—and I don't think with all the reduced fares of modern days this has ever been beaten—offered by the Aberdeen Railway Company, a party of ten of us made up our minds to hazard the journey by what was called a Special Excursion Train. And a very special train it was—specially uncomfortable and specially slow. A third class carriage then was literally a box of hard wood, with a seat of harder wood, dimly lighted with small window panes of coarse glass, where we were "cabined, cribbed, confined" into a space about half the size of the spacious compartments of to-day.

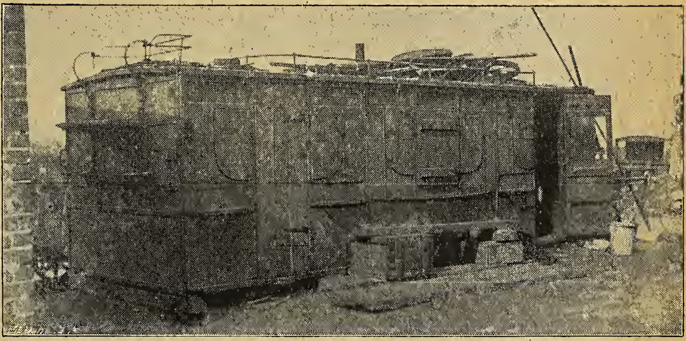


A GREAT NORTH OF SCOTLAND RAILWAY CARRIAGE IN 1862

We left Aberdeen at nearly midnight, and squeezed ourselves as comfortably as ten stoutish men could do into the space at our command. We were young then, and the buoyancy of our spirits kept us lively until morning. Several times during the night our train was shunted into sidings for faster trains to pass, and we soon discovered that the working of our train was to be conducted on the same principle as a slow goods train would be worked. And the tantalising thing was, that we never knew how long we should be kept at a station, so that we could not venture to leave the carriage in case the train should start without us. And the guards, who were changed after very short runs, seemed to enjoy our quandary, and insisted on telling us to keep our seats whenever they saw an attempt on our part to make a sortie. Had we had a conductor, as the London trains have now, I am certain he would have felt sorry for us and provided accordingly.

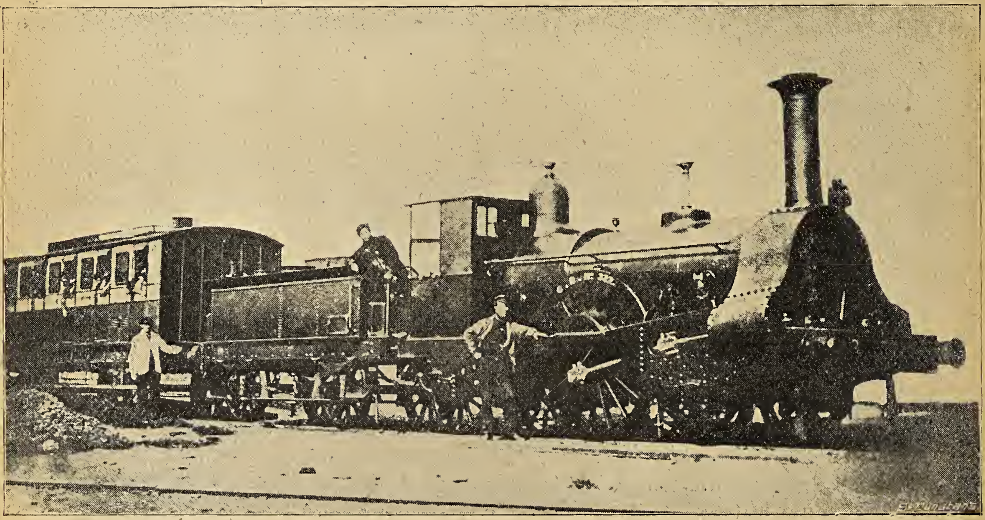
I have said the seats were hard. At first we didn't particularly notice this, but as time wore on, it became only too painfully evident. Oh, the misery of that seat! It seemed to get harder every hour, and at last we felt as though we were sitting on spikes. A seat formed of sharp road metal would have been as a cushion compared to it. The only relief possible was a general rising and standing until our legs gave way, when we had again to sit down.

One of our party was a teetotaller—a *rara avis* in those days, when temperance parties or Local Option Bills were without the range of practical politics. Whether



WHAT IT HAS COME TO
A RAILWAY CARRIAGE BUILT IN 1848 FOR THE SCOTTISH NORTH EASTERN RAILWAY

his intention was to convert the party to his principles or to test the virtue of his favourite beverage I cannot say, but he had provided himself with a two gallon jar filled with cold water. That jar became an object of envy in the eyes of the nine foolish youths who, like the foolish virgins, had provided nothing. We praised the owner, we listened to and agreed with all his arguments in favour of temperance, and even went so far as to pledge ourselves to teetotalism—at all events until we got to London—and so worked on his better feelings that he agreed to dole out an equal allowance of the water to each of us. But though thus our water was sure, the pangs of hunger soon took hold of us. All next day the train crawled along, but we could get nothing to satisfy the craving of our hunger. It was dreadful. We were like shipwrecked mariners in a boat on the open ocean, and towards nightfall, from certain ominous whispers, I could discern that cannibalistic tendencies were beginning to develop in the minds of some of the party. I was not at all comfortable, for I felt that if the necessity arose for extreme measures to be taken, I should assuredly be the first victim, for I was a well favoured and sleek youth in those days—more so than any of the others. But another night passed—a night of horrors for all of us—and dawn found us at Hatfield Station, which we knew was not very far from London. A huge loaf of bread, handed into our compartment by the first friendly porter we had encountered, relieved our hunger and my apprehension, but it was noon before we steamed into King's Cross Station. Needless to say, our first visit was to a restaurant, our progression to which, from the stiffness of our so long quiescent joints, was a "wobbly" one. The pledges to our temperance enthusiast were, I am sorry to say, thrown to the winds, and I shall never forget the reproachful glances he bestowed on us when he saw the grateful tankards at our lips.



A SCOTTISH CENTRAL RAILWAY LOCOMOTIVE BUILT IN 1848

On completing my sojourn in the metropolis, I was determined not to risk the horrors of another land passage such as I had experienced. I preferred rather to "dare the dangerous wave," and had a most pleasant voyage home in one of the Aberdeen steamers, than which no better or more comfortable boats sail from the Thames.

It is gratifying to think that nowadays there need be no fear of such an experience as I had nearly forty years ago.

* * *

Mr. John J. McIntosh, the Locomotive Superintendent of the Caledonian Railway, has been good enough to supply us with two interesting pictures for this article, viz., a Scottish North Eastern Railway carriage, and a Scottish Central locomotive. Of these, Mr. McIntosh kindly supplies the following interesting particulars:—

The Caledonian Railway locomotive, No. 322 (a six-foot single), was built in 1848 by Messrs. Jones and Potts for that portion of our line then known as the Scottish Central Railway, and represents the type of engine that would be in use when Mr. Stuart took the memorable journey of which he writes in your Christmas Number. Coupled on to it is a contemporary carriage, showing the class of coach then running.

The other photograph is an illustration of what, I believe, is the oldest carriage in existence (excepting, of course, the Duke of Wellington's carriage, preserved by the South Eastern Railway, and other "Museum" specimens), but it is of more interest on the present occasion from the facts connected with its history, which I have managed to trace since receipt of your letter. It was built in 1848 by an Aberdeen firm, at a cost of £381, for the Scottish North Eastern Railway, coming into our possession at the amalgamation, and remaining in traffic till 1877, or 29 years' existence.

It was a three-compartment composite, carrying six first class passengers and 16 seconds, and you will observe that it still carries the original guard's roof-seat, outside luggage racks, &c. Of course, it was running at the period under correspondence, viz., 1862.

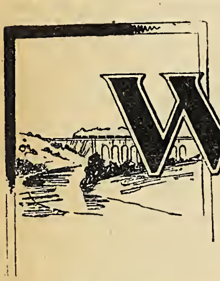
Photo] [*Mr. J. MacKay Thompson.*

CALEDONIAN RAILWAY.

Down *Grampian Express* passing Crieff Junction.

Through Scotland by the Caledonian Railway

By Brunel Redivivus



WHEN one proposes to investigate the excellent train services provided by the Caledonian Railway, a trip northward from Euston is the natural introduction to such a proceeding.

The excellence of the liberal express train arrangements for travellers to and from Scotland by the West Coast Royal Mail route is widely known and appreciated, yet the fact remains that Messrs. Harrison and Turnbull of the London and North Western Railway, and Sir J. Thompson and Mr. I. Kempt, of the Caledonian Railway, are ever introducing improvements into these seemingly perfect services.

In the matter of the West Coast route between London and Scotland, the gentlemen who preside over the expansion of the Caledonian and London and North Western Railways have adopted as their motto *facile princeps*, and having nailed this adage to the mast, live up to their principles by providing unsurpassed accommodation.

Leaving Euston, therefore, by one of the excellent West Coast expresses, we perform the journey over the London and North Western Railway to Carlisle well within the scheduled time, and with a lack of the fatigue and other discomforts so noticeable when travelling on some railways.

At the Citadel station, Carlisle, our train enters Caledonian territory, and proceeds over that railway's well-known main line northward. The powerful "Breadalbane" type locomotive negotiates the Beattock incline in fine style, and in due course we reach Carstairs Junction, 73 miles north of Carlisle. Before continuing our journey to Glasgow, it will be as well to take advantage of the stoppage at this important junction to diverge from the main line and visit the celebrated "Falls of Clyde," reached from Lanark station, which is situated on a branch line four miles from Carstairs. The Falls, 2½ miles distant, are reached by means of coaches.

> The path to the greater falls lies along a beautifully-wooded precipice with awe-inspiring glimpses here and there of the romantic gorge below. At Cora Linn, the grandest of the falls, the river pours its waters over a broken precipice 85 feet high, and the view from the best point, near a pavilion built in 1708, of the torrent pouring into the abyss, overhung by its wood-crowned wall of rock, is not to be soon forgotten. No essential, indeed, of romance is wanting here, for, by the way of human interest, on the edge of the cliff above, rise the ruins of old Cora Castle, and a path descending to the riverside leads to Wallace's Cave, which the hero is said to have reached by springing across the torrent, and where he is said to have found a safe retreat.
>
> At Bonnington Linn, half a mile higher up, the river sweeps round a rocky cape, and hurls itself over a sheer precipice of thirty feet, plunging from the sunny pastoral uplands of Lanarkshire to rush in twilight along the base of the beetling precipices at the bottom of its tremendous chasm."

Returning by the branch train to Carstairs, we find a Caledonian railway express waiting to convey us to Glasgow, a distance of 29 miles, which the train covers in 50 minutes. The train comes to a standstill in the Central Station at Glasgow, and having arrived at the Scottish commercial capital, we pause to decide in which direction we shall first sample the various excellent services of express trains provided by the Caledonian Railway.

Gourock

The sea has a strong fascination for most of us, and we cannot do better than avail ourselves of the excellent services provided by the Caledonian Railway to the various Clyde coast resorts.

Not only are express trains frequent, but the fares are probably cheaper than can be found in operation elsewhere.

Here are some examples :—

	Third Class.			
	Single.		Return.	
	s.	d.	s.	d.
Glasgow to Greenock, 23 miles ...	0	9	1	6
,, Gourock, 26 ,, ...	0	11	1	9
,, Wemyss Bay, 31 ,, ...	1	2	2	0
,, Ardrossan, 29 ,, ...	2	0	2	6

What can be better than, say the 4.8 p.m. train from the Central Station, Glasgow, to Gourock? The popularity of this express is shown by the fact that it is daily composed of ten or twelve modern bogie vehicles, and, despite its weight, the 26 miles to Gourock are covered in less than 32 minutes (without an intermediate stop). Awaiting the arrival of this crack coast express are three of the fastest steamers of the Caledonian fleet, and the finest thing of the kind we have ever seen or heard of, is performed daily at Gourock. We have already mentioned that the run of 26 miles from Glasgow to Gourock is done in less than 32 minutes, the steamers are timed to leave Gourock at 4.45 p.m.—37 minutes after the train starts from Glasgow—and they do it, too. The passengers walk on board and before they have found seats, the three boats have already left the pier and are on their voyages to Holy Loch, Kirn, Dunoon, Innellan, and Rothesay. No luggage is allowed to be taken by this express. The fares on the steamers are also remarkably cheap.

No less than 20 boats are run to Rothesay daily by the Caledonian Railway, which, with the other boats, probably give the charming capital of Bute the best steamboat service in the world.

The return service is on an equally liberal scale. Whilst on Saturdays you can leave Glasgow as late as 9 10 p.m., and return on Monday mornings at 5.47, arriving at Glasgow at 7.45 a.m. No wonder, then, Rothesay is so popular with the business people of Glasgow, Edinburgh, and the intervening towns, for no matter how excellent the natural advantages and salubrity of a watering place, unless the travelling facilities are framed on a liberal scale, the place cannot become popular. The efficient services of the Caledonian Railway to Rothesay and the other Clyde coast resorts have firmly established the

Wemyss Bay Pier

positions of these charming and fashionable seaside resorts.

The sea trips that can be inexpensively made by the Caledonian Company's steamers from the various Clyde coast towns are so numerous that they require an article to themselves.

But as we have other places to see, we must return to Glasgow. The shortest way so far as time is concerned from Rothesay is *via* Wemyss Bay, the steamer only taking 25 to 30 minutes, and the fast trains thence to Glasgow about 50 minutes.

The heavy coast expresses are usually drawn by the fine six-coupled "815" class of engines just built by Mr. McIntosh; these have coupled wheels, 5 ft. diameter, and immense boilers, with 1,440 sq. ft. of heating surface.

Like the "Dunalastairs" and "Breadalbanes," the boilers are very high pitched.

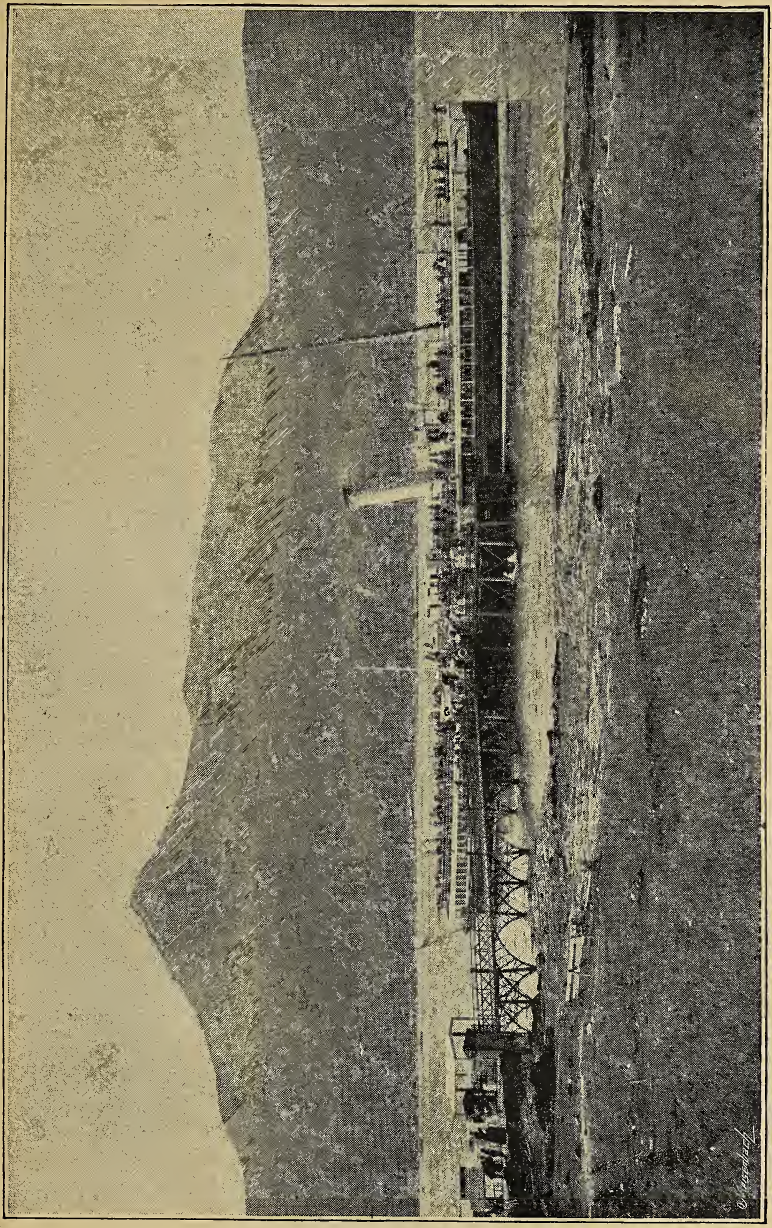
With these small driving wheels, by making the boilers of oval shape, with the major axis perpendicular, an immense increase in heating surface could be obtained; perhaps this will be the next development of these high-pitched locomotive boilers.

Having decided upon visiting the "Charing Cross" of the North, as Oban, the capital of the Western Islands, is called, in consequence of its being the starting place for the numerous steamers plying to the Western Islands and Highland ports, we find that the quickest route is by train direct from Glasgow (Buchanan Street) *viâ* Stirling, Callander, and Crianlarich. The railway from Callander to Oban was constructed by an independent company, and opened throughout in July 1880; it is a single line, worked by the Caledonian Railway Company. Another route (which we chose) is *via* Loch Lomond, joining the Callander and Oban Railway at Crainlarich; it includes a voyage upon the romantic waters of Loch Lomond from one end to the other, and a drive through Glenfalloch.

Leaving the Low Level Central Station at Glasgow, the train proceeds over the Glasgow Central Railway, and on to the Lanarkshire and Dumbartonshire and Dumbarton and Balloch Line (Caledonian and North British Joint Railway).

Traversing the north bank of the Clyde, we obtain views of the many shipbuilding yards for which the district is famous, and see iron leviathans of the deep in various stages of completion. Passing under the shadow of the immense rock, upon which is built Dumbarton Castle, we shortly after branch to the right, and after a run of a few miles, the train draws up on Balloch Pier, at the southern extremity of Loch Lomond. The "Princess May," one of the fine new steamers which the Joint (Caledonian and North British) Railways have recently placed on the Loch, is in readiness, and we are soon swiftly

THE CALEDONIAN RAILWAY'S EXPRESS STEAMER "GALATEA" gliding over the isle-bestudded surface of Lomond's lovely lake. We will not stay to describe the beauty of the voyage—does not every guide book do so *ad nauseam?*

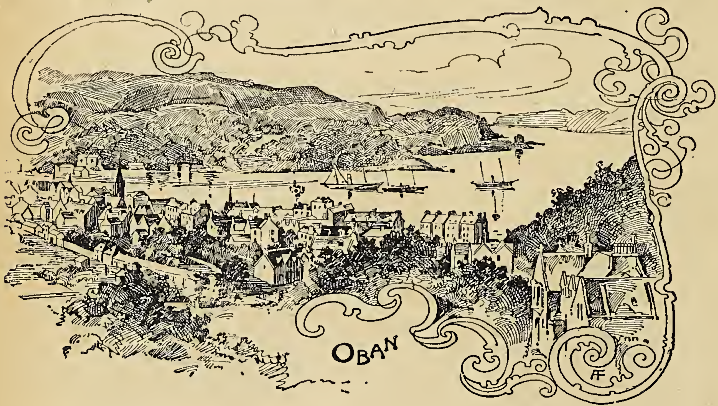


From a Photograph by G. W. Wilson & Coy.

McCorquodale & Co. Ld., Glasgow & London.

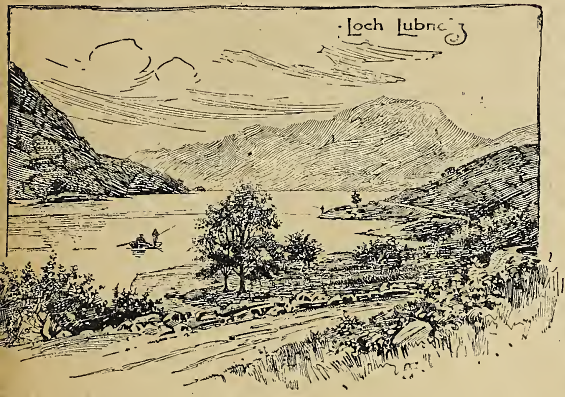
BRODICK PIER, ISLE OF ARRAN, WITH CALEDONIAN RAILWAY STEAMER ALONGSIDE

The steamer's journey to Ardlui, at the head of the Loch, occupies about two hours, where a coach is waiting to drive the tourist through Glenfalloch to Crainlarich. The Caledonian Railway station at Crainlarich is many feet below and about five minutes' walk from the West Highland Railway Station. There is a spur line connecting the two railways, but it is but little used. As there is an important exchange of traffic from the North British system at this point, it would have been advantageous to have chosen a more convenient site for the West Highland line station. We are soon travelling in a luxurious Caledonian train westward to Oban. After leaving the station, the West Highland Railway crosses the Caledonian line on a lofty lattice viaduct, and turning sharp to the left runs parallel with it, but at an increasingly higher altitude, for several miles, until Tyndrum, where both railways have stations, is reached,; the West Highland line then turns northward, and is soon lost to sight in the mountains. The Oban railway continues westward, the stations being many miles apart, and the line now falling, now rising on a gradient frequently as severe as 1 in 50, and with sharp curves alternately to the right and left, gives the travellers glimpses of rugged mountain scenery that cannot be surpassed. Passing places on the single line are provided between some of the stations—and at these spots, such as Glenlochy, far away from other houses, cottages have been built by the railway company for the signalmen and their families.



After leaving Loch Awe Station, the railway is constructed along the banks of the picturesque lake, upon which the "Countess of Breadalbane," and other steamers make daily excursions in connection with the railway.

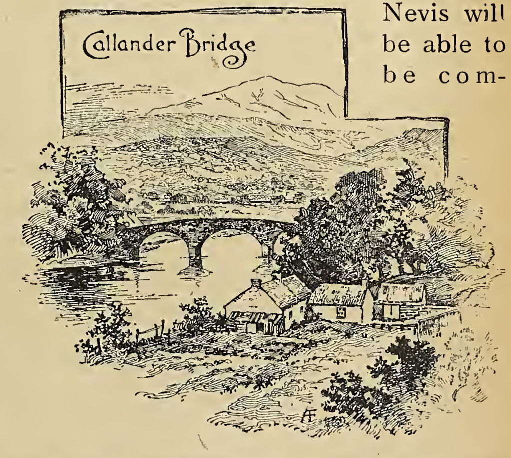
The romantic scenery of the loch soon gives place to the majestic grandeur of the River Awe, close to and parallel with which the line runs for many miles. This is succeeded by a view of Loch Etive on our right, till Connel Ferry Station is reached. And now our journey approaches completion, although the intervening six miles to Oban occupy from 18 to 26 minutes (including the stop at a platform named "Tickets"!), so tortuous is the course, and so severe the gradients. An approach to the town suitable for a railway was most difficult to find, the line curving right around the outskirts, and having a station on the quay at the south end. Having reached the "Mecca" of all visitors to the Highlands, we pause, lost in contemplation of the wonderful vista of loch, mountain, wooded hill, and blue sky before us. The bay is generally covered with numerous private steam and sailing yachts, whilst, quite a fleet of passenger steamers are continually arriving at and departing from Oban. The sea, even at the quay side, is wonderfully clear, the bottom being distinctly visible, although it is 20 or more feet in depth. We do not intend to describe the wonderful beauties of Oban, but we cannot refrain from mentioning the grand wood and sea scenery to be found along the Gallanach Road, with its splendid avenue of trees, forming a perfect archway overhead, thereby providing a place for a cool saunter, be the day ever so hot. The railway traffic to Oban bears eloquent testimony to the popularity of the place. One morning when we were there, the 8.45 a.m. train (8 p.m. *ex* Euston) arrived, with six fully occupied sleeping saloons, a record for any town, let alone for this northern Charing Cross.



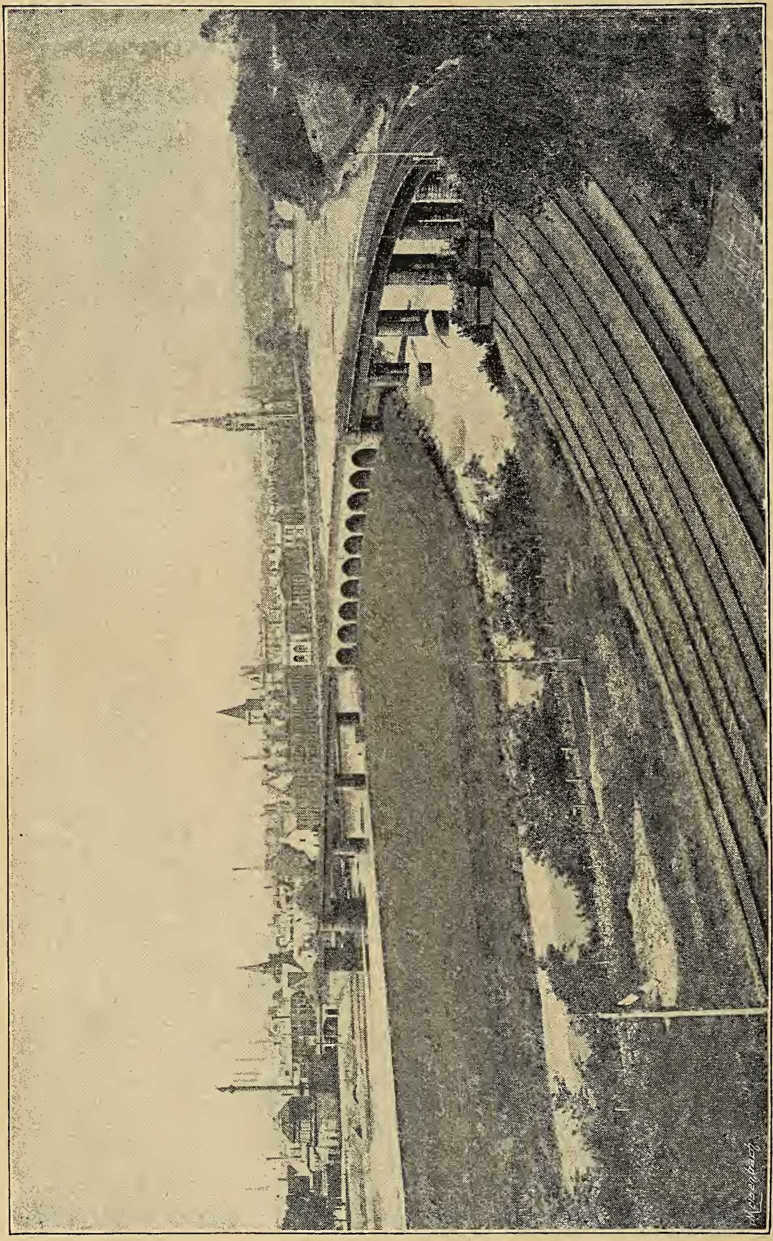
The Oban signal-box is at a considerable elevation above the line, higher than any other we are acquainted with; it is situated midway between the ticket platform and the passenger station. The line at the spot is in a deep cutting, but the signal-box is placed high enough for the signalmen to command both the ticket platform and the station by looking across a bridge carrying a road over the railway at the spot.

The West Highland line of the North British Railway is considered somewhat in the light of an encroachment on Caledonian territory, and a branch line from the Oban Railway at Connel Ferry, now under construction, may be looked upon as a defensive tactic of the Caledonian Railway. The new line commences with "Y" junctions with the existing railway on the Oban side of Connel Ferry Station, and will cross Loch Etive close to the ferry, at a spot described—why, we know not—as the "Falls of Lora." When we visited the place we saw the countenance of our companion *fall*, when the spot with the grandiloquent name was pointed out, but as the tears of disappointment were restrained, we did not see the *water fall*. The line is to be continued along the bank of Loch Linnhe to Ballachulish, the nearest town to the famous pass of Glencoe, now only reached by means of steamers from Oban. It will also form an alternate route to Ben Nevis, so that during the tourist season, the Caledonian Railway will obtain the remunerate traffic to these show places now absorbed by the steamers from Oban.

At present, anyone staying at Oban and wishing to ascend Ben Nevis and return to Oban the same day, must leave by the 6 a.m. boat for Fort William, and cannot get back till 9 p.m., but when the railway to Ballachulish is opened the ascent of Ben Nevis will be able to be comfortably performed in nine hours, including the railway journey to and from Oban. Time will show whether the Caledonian Railway will be content to



allow Ballachulish to remain the terminus of the line, but we rather fancy an extension along the banks of the Caledonian Canal to Inverness will in the near future be within the range of practical railway politics.



PERTH FROM BARNHILL, SHOWING THE RAILWAY BRIDGE ACROSS THE RIVER

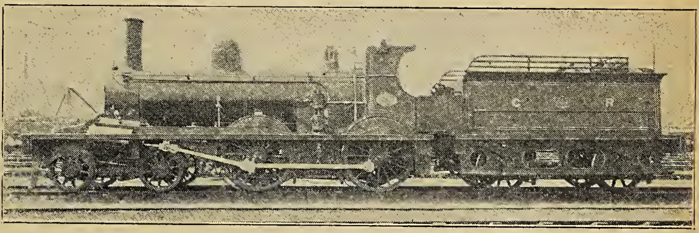
Turning our back upon the seductions of Oban, we next determined to cross Scotland from west to east, and visit the Granite City, the oriental extremity of Caledonian Railway territory. The distance to Aberdeen is some 200 miles, but we could not expect to cover the space in the time the "Flying Dutchman" journeys from London to Exeter. We found, however, that on Mondays a train left Oban at 7.5 a.m. and enabled us to reach Aberdeen at 2 p.m. This train is run for the convenience of Glasgow business men spending the week end at Oban, and is timed somewhat quicker than the other trains on the Callander and Oban branch, making only five intermediate stops. Now although the speed may not appear to be more than mediocre, upon reflection readers will see that to run such a train at all on a single line, requires a great deal of careful arrangement on the part of the responsible railway officials. The time-table having been prepared in the usual way, and the crossings of the up and down trains arranged for, to interpolate an up additional train, which must cross several down trains and yet not upset the whole of the train arrangements on a branch 80 miles long requires very delicate manipulation. The task has been successfully carried out in the timing of the 7.5 a.m., Mondays only, from Oban. At some stations the train arrived 5 or 6 min. before the scheduled departure time, but as starting time arrived, a down train approached and passed us, and we left "on time." The train is timed to run from Dalmally to Lochearnhead, a distance of 34½ miles in 76 min., without an intermediate stop in the public time-book, as a matter of fact we did the run in 64 min., six of which were spent at Crainlarich, waiting for a down goods to cross us, and yet we left Lochearnhead to time.

We have already described the railway between Crainlarich and Oban; below the former station the line continues to traverse a district unequalled for wealth of scenery. On no other British line can such splendid views of mountain, loch and wood be passed through continuously for mile after mile.

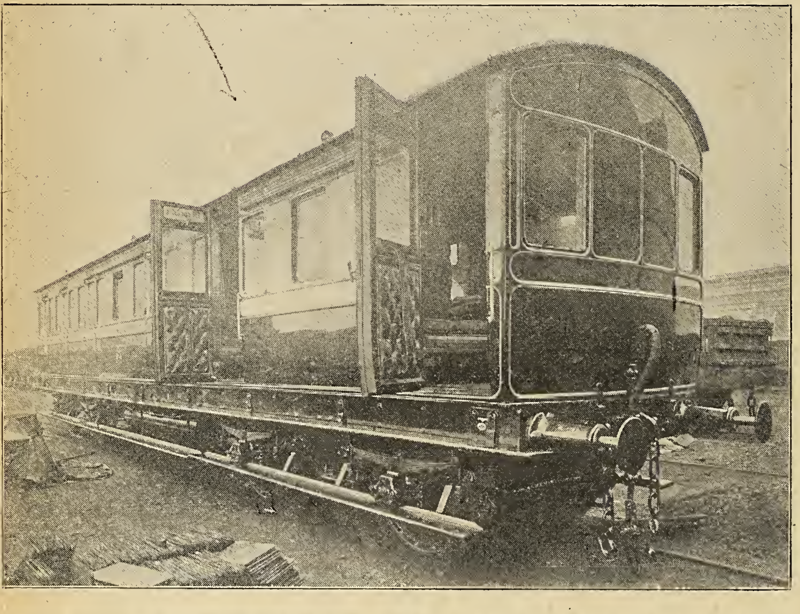
The reflections in Loch Lubnaig are as perfect as if one were studying nature by means of a huge mirror.

The Caledonian Railway is most solicitous to provide facilities for tourists. A station named Falls of Cruachan has been erected a few miles from Taynuilt, where certain trains call, to enable a visit to be made to this delightful torrent and cascade. The return fares from Oban are abnormally cheap.

Then at King'shouse, by giving notice to the guard, passengers can alight from certain trains, and so visit the romantic scenery of the Braes of Balquhidder. Beyond Dunblane, the country becomes more cultivated, we pass fields of oats, corn, and roots, as we might do in any of the home counties of England. On the Oban section it is rare to see even hayfields, whilst only very occasionally is a crop of oats or potatoes passed.


THE TYPE OF CALEDONIAN RAILWAY LOCOMOTIVE USED ON CALLANDER AND OBAN LINE

Changing at Dunblane, we take our place in the Aberdeen Express, and, passing Allan Water, Crieff Junction, and Auchterarder, we arrive at Perth, in which station we make acquaintance with the rolling stock of the Highland Railway. The Highland trains have running powers over the Caledonian Railway for 7 miles north-east to Stanley Junction, where the former diverges to the north by a single line. The branch of the Caledonian Railway has a fine bridge across the Tay at Perth (see illustration). The Main line to Aberdeen is fairly level and free from curves, so that we can enjoy the high speed for which the Caledonian Railway is famous. Beyond Dubton Junction (for Montrose) we pass Kinnaber Junction, the winning-post of the famous race to Aberdeen. It is at Kinnaber that the North British line joins the Caledonian Railway, the former having running powers only over the latter to Aberdeen. The Station at the Granite City is the joint property of the Caledonian and Great North of Scotland Railways, and although, when erected, ample provision was made for the contemplated increase, it is far too small for present requirements, and plans have already been prepared for a larger structure.



MODERN COMPOSITE BOGIE COACH WITH COUPÉ AND LAVATORIES, AS USED ON CALEDONIAN RAILWAY EXPRESS TRAINS

After passing Stonehaven, passengers obtain frequent glimpses of the German Ocean through the various creeks leading down to the shore. The rocks rise to a considerable height at places; and altogether the coast is very romantic, many pleasant seaside villages being scattered on the littoral. The beach at Aberdeen is the finest in Scotland, whilst both the bathing and sands are unequalled.

Visitors wishing for a bracing climate, good bathing, and the advantages of an important City by the Sea, cannot do better than visit Aberdeen; or, if they prefer to be away from the fashionable shops, theatres, and other accompaniments of modern civilisation as found in towns, they can stay at one of the numerous resorts adjacent to the Brighton of the North, which are so admirably served by the Great North of Scotland Railway.

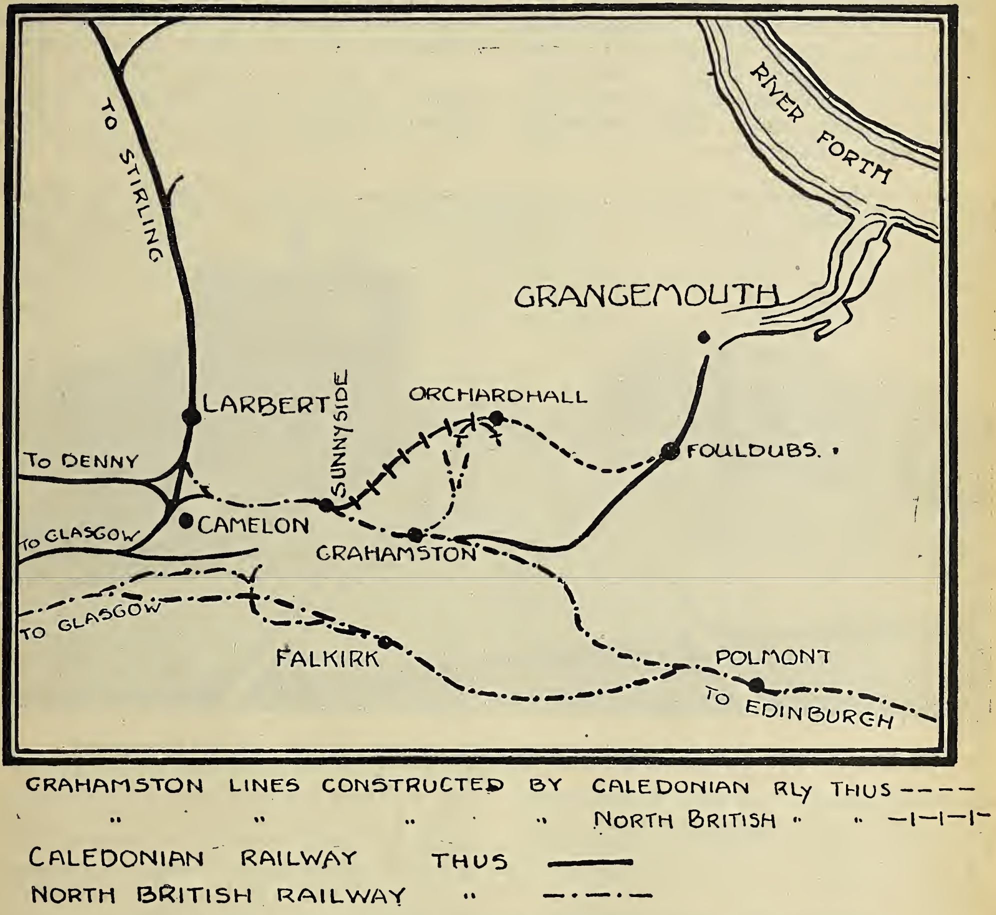
Balmoral Castle is reached from Aberdeen by means of the Deeside branch of the Great North of Scotland Railway.

Before closing this account of our journey over a portion of the Caledonian Railway, we cannot refrain from mentioning the splendid scenery, many places of historical interest, and natural phenomena to be met with on the Crieff section of the railway. By leaving the main line at Perth, and travelling *viâ* Methven Junction to Crieff, and thence back to Crieff Junction, tourists are able to see much that every visitor to Scotland ought to see, without twice passing over any portion of the same ground.

May 1905

The New Grahamston Lines of the Caledonian and North British Railways.

Traffic to and from Grangemouth Docks, Caledonian Railway, in conjunction with that of the North British Railway in the vicinity, has caused the route *via* Grahamston to be severely congested at times, and to relieve this new lines were constructed and brought into use for goods and mineral traffic on October 23, 1911. As both companies are concerned the new lines are treated as joint Caledonian and North British, though the portion from Sunnyside to Orchardhall (1 mile 44 chains) was built by the North British Company, and the section thence to Fouldubs (1 mile 32 chains) by the Caledonian, under the supervision of the respective chief engineers.



TO STIRLING
RIVER FORTH
GRANGEMOUTH
LARBERT
SUNNYSIDE
ORCHARDHALL
FOULDUBS.
TO DENNY
CAMELON
TO GLASGOW
GRAHAMSTON
TO GLASGOW
FALKIRK
POLMONT
TO EDINBURGH
GRAHAMSTON LINES CONSTRUCTED BY CALEDONIAN RLY THUS ----
" " " " NORTH BRITISH " " —I—I—I—
CALEDONIAN RAILWAY THUS ——
NORTH BRITISH RAILWAY " —·—·—

PLAN OF NEW LINES AT GRAHAMSTON, CALEDONIAN AND NORTH BRITISH RAILWAYS.

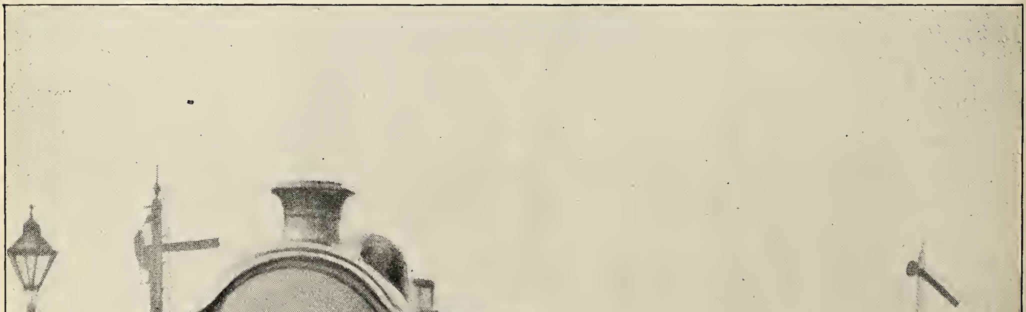
R.M. JAN: 1921

The "Grampian Express."

The Caledonian Railway's New Corridor Train between Glasgow, Edinburgh, and Aberdeen.

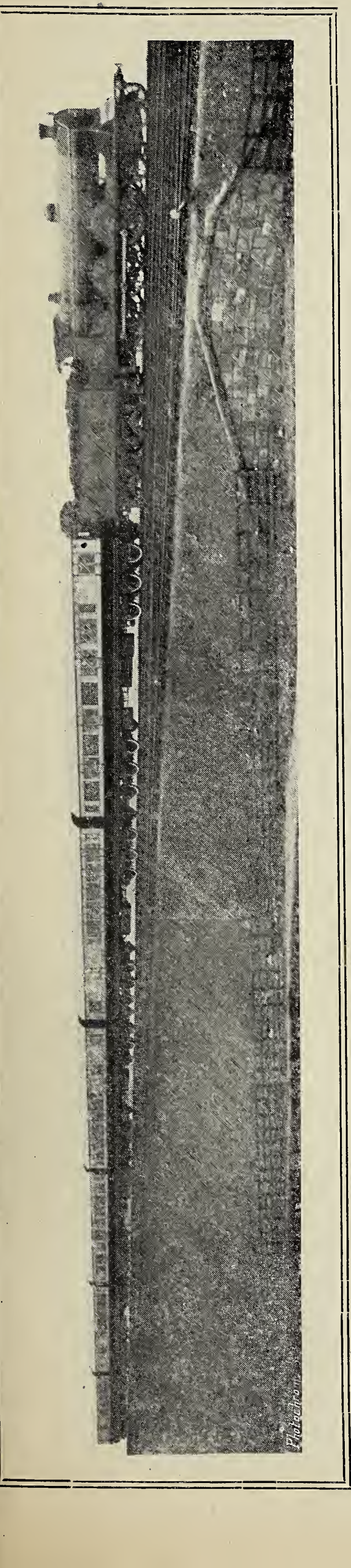
By G. A. Sekon.

FOR some time past it has been the desire of Mr. R. Millar, the able General Manager of the Caledonian Railway, to place in service on its main line from Glasgow to Aberdeen, trains, the vehicles of which should equal, if not excel, any passenger coaches in the United Kingdom. It goes without saying that Mr. Millar's efforts were, from the first, most enthusiastically seconded by Mr. Calthrop, the energetic Superintendent of the Line. Mr. McIntosh, the Loco and Carriage and Wagon Superintendent of the Caledonian Railway, entered heartily into the spirit of the suggestion of the Traffic Department, and the wealth of his resource and inventive genius is shown in the excellent train which he has produced.


THE "GRAMPIAN EXPRESS" PASSING ST. ROLLOX ON ITS TRIAL TRIP, APRIL 6TH, 1905.

In carrying out the project, advantage has been taken of all modern improvements that make for increased comfort, so that the train possesses a number of noteworthy and novel features.

The new train consists of six carriages (of the side corridor type), four running



THE "GRAMPIAN EXPRESS."

The Caledonian Railway's New Corridor Train for the Glasgow, Edinburgh, and Aberdeen service.

from Glasgow and two from Edinburgh, the portions being united at Perth on the down trip, and separated there on the up journey from Aberdeen.

The carriages are exceedingly long, measuring 65 feet over the body, and 68½ feet over the buffers.

In order to provide the maximum of seating accommodation, and air space per passenger, these carriages have been built to the utmost breadth and height permitted by the gauge limitations of tunnels, bridges, etc., and during the trial trip special observations were taken to see that everything was right in this respect. The new high curved roof (as recently adopted by the Great Western Railway in place of the clerestory), is a noticeable feature of the vehicles comprising the train.

Even the "man in the street," who, on stepping into a *third-class compartment* becomes "a man on the train," cannot but be highly impressed by the wealth of improvements which greet him. The third-class compartments are constructed of mahogany, and upholstered in French carpet of peacock-blue colour, variegated by a black floral design, and orange spots. Underfoot is a layer of thick cork linoleum of bright pattern, while overhead, and along the tops of the walls is Lincrusta Walton panelling, treated in white enamel.

The backs of the seats, which are fitted with spring cushions, exactly fit the curve of the body, and the upholstery extends higher than usual. By means of a special arrangement of the spiral sofa springs, on which rests the cushion stuffed with curled horse-hair, the elasticity of the seat extends to the very edge. Four-a-side is the extent of the accommodation, which, although liberal, has not hitherto been achieved in any British side corridor cars.

On either side of the ceiling is an air extracting ventilator, supplementary to which is a series of permanently open perforations on the top of the door leading to the corridor, while in the centre of the ceiling is an artistic bronze four-light electrolier with opal shades. Spring roller blinds with ornamental bronze covers are fitted to the windows, and also on the door lights, the latter being effectually kept in any desired position by a recently-patented appliance. The doors are fitted with automatic draught excluders, and an improvement to be noticed on the window-sills are the sloped recesses for draining moisture from the panes. The light-luggage racks are of corrugated brass wire. There are also the new passenger communication apparatus, a serviceable mirror, and the Caledonian Railway's official, hotel and other notices, including a newly-prepared panoramic map of the Caledonian Railway-system and plan of Glasgow and District. Such is the accommodation provided for the "penny-a-miler."

Now, to the *first class compartments* (which are separated from the thirds by a door in the corridor), we find them beautifully finished. Needless to say, they contain all the various furnishings found in the thirds, only more ornate in character.

The woodwork is in walnut, polished and relieved with gilt scrolls. The upholstering is in brown tapestry moquette trimmed with silk vellum lace. Over the floor linoleum (in non-smoking compartments) is a cashmere rug of a pattern and shade harmonising with the cushions, etc.

The roof and top sides are of Lincrusta Walton treated in white and gold.

The four-light electrolier is gilt, and the metal covers of the window blinds are to match, the inside of the doors being padded with embossed Morocco leather.

The passenger accommodation here is three-a-side.

The side corridors (which are exceedingly well lit) are floored with cork matting, and are provided with stout brass hand-rails across the windows.

The symmetrical curving of the compartment and corridor roofs, in contrast to the usual lop-sided appearance which the dividing partition in other corridor cars gives, is a decided improvement.

In the *lavatories*, the walls of which are Emdecca art tiling, there is, in addition to the usual cold water, the novelty of a supply of hot water for use during the winter months.

The train is lighted throughout by electricity, generated by dynamos on Stone's double battery system, and driven off one of the running axles on each carriage, the voltage being twenty-four.

When fully charged the capacity of the accumulators permits of about nine hours' lighting as a reserve. The total strength of the light in each compartment is 40 candle power in the first classes, and 32 in the thirds, as well as in the corridors. The guard, by means of a controlling switch, can turn on the half of the lights, that is, two lights in each compartment, simultaneously throughout the train when passing through tunnels, etc., and by the main switch he can turn on or extinguish the whole of the lights.

The train is capable of being heated, when required, by steam, which passes into an acetate-of-soda-charged cylinder, situated under the middle of each seat, a controlling handle placed on either side of the compartment enabling passengers to regulate the temperature to their liking, or to shut off the heat altogether.

The guard's van contains, in addition to the usual equipments, suspenders and floor racks for cycles, a safe locker for consignments of special value, and the appliances for controlling the heating and lighting of the train.

Though these carriages are abnormally long, the most improved means have been adopted for lessening vibration, and preventing discomfort to passengers. To adapt themselves readily to the curves on the road, they are supported on six-wheeled bogies at either end, and to prevent oscillation—lateral and vertical—these bogies are provided with three different varieties of springs, in addition to which the carriage is entirely suspended on a continuous and substantial bearing of indiarubber, which intervenes between the body and underframes on which it rests.

To reduce the noise of running to a minimum, not only are the bogie wheels of the well-known solid Mansel type, but an ingenious form of patent hair felt is interspersed through the carriages under the floor, as well as up and down the sides and along the roof.

The outside of the carriage is painted in the harmonious colour scheme now adopted by the Caledonian Railway, namely, white upper panels and lake body, the underframe being black and the roof white. Each vehicle is lettered on either side in bold gilt capitals, the Glasgow carriages bearing the inscription :—"Corridor Express—Glasgow, Perth, and Aberdeen," and those for Edinburgh traffic :—"Corridor Express—Edinburgh, Perth, and Aberdeen." Exclusive of passengers and luggage the train of six carriages weighs 210 tons, and provides accommodation for 264 passengers.

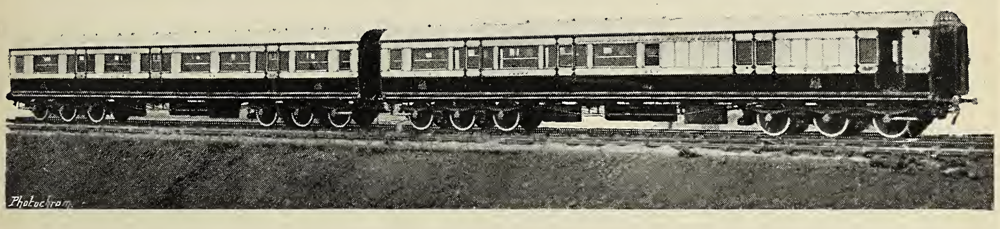
This is the first vestibule train constructed for purely Scotch traffic.

The train was built at the principal workshops of the Caledonian Railway at St. Rollox, Glasgow.

It is worthy of mention that the whole of the coaches forming the new trains (there are two) have been constructed out of revenue, and the Caledonian Railway is entitled to considerable credit for the adoption of so sound a financial principle. On many railways the cost of the new equipment would have been charged to capital.

A trial trip of the new train was made on Thursday, April 6th, when a party of guests accompanied Mr. Millar, the General Manager, Mr. McIntosh, the Locomotive Superintendent, Mr. Blackburn, the Secretary, and other officers, in a run by the train from Buchanan Street, Glasgow, to Aberdeen and back. Mr. Calthorp, the Superintendent of the Line, was absent in consequence of a family bereavement, so Mr. Pettigrew, his chief assistant, represented the traffic department.

The train was strengthened by the addition of a W.C.J.S. dining car, the vehicle selected being the coach that obtained the "Grand Prize" at the Paris Exhibition of 1900, the total weight of the train being about 250 tons. The locomotive giant that horsed the train was No. 49, a sister engine to the "Sir James Thompson." This engine, as readers of the RAILWAY MAGAZINE know, has six-coupled wheels, six feet six inches diameter, inside cylinders 21 inches diameter by 26 inches stroke, and a heating surface of 2,400 square feet, the weight of No. 49 with the eight-wheel tender loaded is 128 tons.



TWO COACHES OF THE GLASGOW PORTION OF THE "GRAMPIAN EXPRESS."
Composite 1st and 3rd, and a break third.

The daily work of No. 49 is the running of the 2.0 p.m. Glasgow-London Corridor Dining Train from Glasgow, Central, to Carlisle, and the corresponding London train from Carlisle to Glasgow, which includes a ten-mile climb on a gradient of 1 in 75, with a load of about 400 tons.

This is the same engine, it will be remembered, that, unassisted, ran His Majesty the King's Special last autumn from Dunblane to Aberdeen without a stop.

On the down journey of the trial trip, the only stop made by the new train was at Perth, where the tender was replenished.

Luncheon was served after leaving Perth, and at its conclusion Mr. R. Millar proposed success to the new venture, the toast being received with much enthusiasm. Mr. J. F. McIntosh, in the course of a few remarks, suggested "The Grampian Express" as a suitable title for the new train.

As the "Dunalastair the 3rds" are so gigantic there are few turntables large enough to turn the engine and tender, and it was therefore necessary to detach the engine from its appendage at Ferryhill and perform the turning operations of the engine separate from that of the tender.

The return run from Aberdeen was commenced at 3-15 p.m., and the writer was accommodated with a place on the footplate of 49, Inspector Duncan, of the locomotive department, as well as the driver and fireman, being also on the engine.

A most severe side-wind was encountered, and, with a train weighing about 250 tons, the mammoth engine had a fair task before her, but a high speed was soon reached, and hope was expressed that the timing would be less than that usually spent on the section. Unfortunately, this aspiration was not realised, for the train was brought to a standstill at a wayside for some minutes, because the signalman had allowed an empty wagon train to precede the special, labouring under the mistaken impression that the wagon train would have ample time to arrive at the next station, and be shunted there before the approach of the trip train was heralded.

The writer proposed to leave the train at Perth, but the officers persuaded him to continue the journey on the footplate, in the hope of an exceptionally good run thence to Glasgow. The fates decided it was not to be. No locomotive water was available at Perth, so advantage was taken of a stop at Larbert to replenish the tender. Before Larbert was reached the train was again stopped by signal.

On several occasions, however, the speed reached quite eighty miles an hour, which, considering the strong wind and the weight of the train, was a most meritorious performance, and speaks most eloquently for the excellent design and the amount of reserve power that engines of the "50" class possess.

Although a six-coupled locomotive, the riding on the footplate, even at the highest speed, was, comparatively speaking, remarkably steady, indeed, trips on single engines at a lower speed have produced more oscillation. Under the practical guidance of Inspector Duncan, the driving of the engine left nothing to be desired, the needle of the steam pressure gauge kept steadily at 200 lbs. (the "blowing-off" pressure of the engine).

The actual running time of the train was:—

Down run—

Left Glasgow	10.25 a.m.
Reached Perth	11.49 ,,
Left Perth	12.11 p.m.
Reached Ferryhill	2. 4 ,,
Left Ferryhill	2.10 ,,
Reached Aberdeen	2.14 ,,

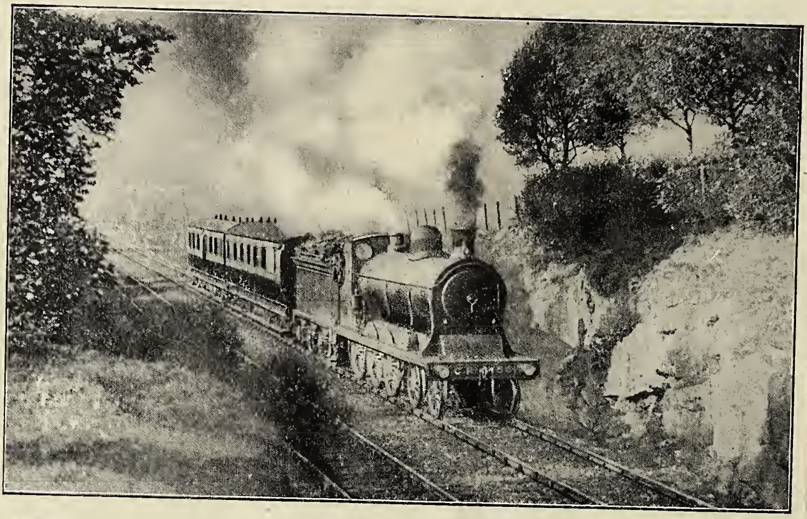
Up journey—

Left Aberdeen	3.15 p.m.
Reached Perth	5. 8 ,,
Left Perth	5.22 ,,
Reached Larbert	6.16 ,,
Left Larbert	6.20 ,,
Reached Glasgow	6.49 ,,

The distance between Glasgow and Aberdeen is 153 miles.

In connection with this trial run, it is well worthy of record that the train ran straight from the St. Rollox workshops, and arrived back at Buchanan Street, a journey of over 306 miles, *with every axlebox as cool as on starting*, notwithstanding that after deducting the actual stops the running time was 3 hours 13 minutes down, and 3 hours 6 minutes up, which does not include the considerable time lost preparatory to stopping at and in starting away from the six danger signals encountered.

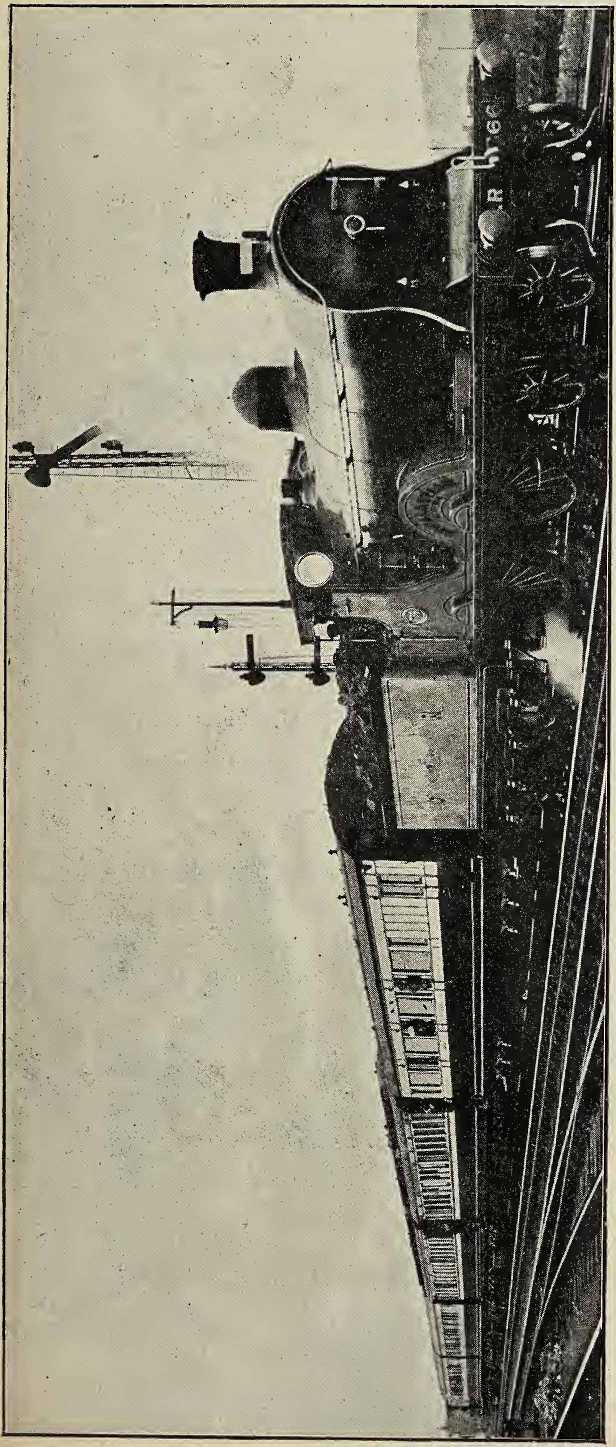
The new Corridor Train commenced to run on Monday, 10th April, leaving Glasgow, Buchanan Street, at 10 a.m., and Edinburgh, Princes Street, at 9.25 a.m., returning from Aberdeen at 5.25 p.m.



Photo] CALEDONIAN RAILWAY. [*Mr. E. Devonshire Jones.*

Callander–Glasgow Express leaving Callander ; 4-6-0 Locomotive No. 55.

The Caledonian Railway's Arrangements for *De Luxe*, Home and Continental Excursions.



CALEDONIAN RAILWAY.

Special train, composed of Grampian *de luxe* Corridor Coaches, from Glasgow to Euston, on May 10th, 1907.

RECENTLY the municipal authorities of Lyons made an extended tour of the principal cities in Great Britain. Everywhere they met with the greatest hospitality, and not least was this shown in Edinburgh and Glasgow. On the return home of the deputies invitations were issued to the municipalities, who had so lavishly entertained the French visitors for a return visit during May of this year.

A party of Scotsmen, consisting of the Lord Provosts of Edinburgh and Glasgow and the Provost of Leith, along with magistrates, councillors, and their wives, and a few prominent officials, numbering in all seventy-five persons, responded to the invitation, and started on Friday, May 10th. Not only will Lyons be visited, but the Municipalities of Dijon and Grenoble will also entertain the party. A few days will be spent in Paris, and some of the members return by way of Switzerland.

The travel arrangements were entrusted to the Caledonian Railway, which, as readers of the RAILWAY MAGAZINE know well, has of late years shown much enterprise and earned thereby an excellent reputation for providing continental, as well as home, travel arrangements *de luxe*. In conjunction with Messrs. Frame, the Continental Agents of the Caledonian Railway, who provided the courier accompanying the deputation, and the London and North-Western Railway, the journey to Lyons from Scotland and the return trip were accomplished in easy stages with a degree of comfort and pleasure, only to be surpassed by the entertainment provided by the Municipalities of Lyons, Grenoble and Dijon.

The Caledonian Railway provided for the party from Scotland to London one of the finest trains ever assembled in the country, composed of their well known "Grampian de luxe" carriages, as shown in the accompanying photograph. These coaches, introduced two years ago by the enterprising manager and superintendent of the Caledonian Railway, are considered by many experts to be the most comfortable and best running vehicles in Great Britain. In length 69 ft., and weighing 37 tons 10 cwt., the coaches run on two 6-wheeled bogies, and many qualified to judge consider this rolling stock represents the *dernier cri* for comfortable long distance travel.

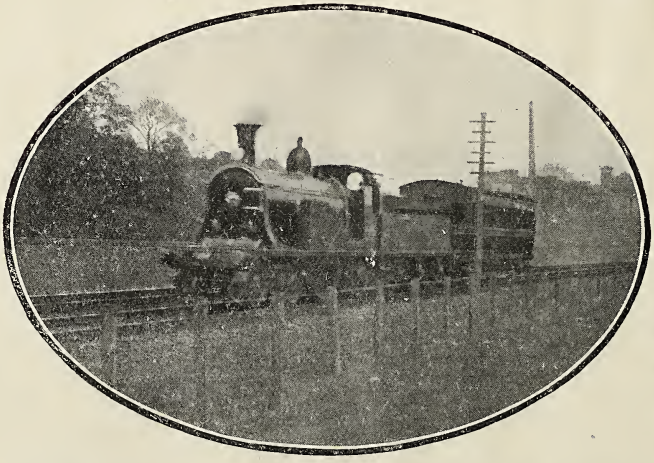
The special train was timed as follows :—

Glasgow (Central,	dep.	.. 2.20 p.m.
Carlisle	arr.	.. 4.30 p.m.
	dep.	.. 4.35 p.m.
Euston	arr.	.. 10.30 p.m.

Although leaving Glasgow twenty minutes later than the ordinary West Coast afternoon diner, the latter was passed at Preston, and Euston reached fifteen minutes ahead of the 2 p.m. from Glasgow, and this was done without the slightest attempt at extremely fast running.

It may be of interest to mention the fact that the Caledonian Railway is contemplating placing one of these magnificent trains on the summer season weekly cheap excursion service between London (Euston) and Glasgow, commencing in June. An arrangement has been made whereby the train which takes the Glasgow people to London on Thursday nights will bring the London to Scotland excursion passengers down to Glasgow, etc., on Friday nights, thus ensuring a most economical method of working the traffic while affording to the English as well as Scottish excursionists equal and unrivalled facilities for comfortable and rapid travel. Indeed, it can be said quite safely that never before has such luxurious accommodation been provided for excursion passengers "Over the Border." Doubtless they will not be slow in taking full advantage of it! The Caledonian Railway, while desirous of promoting the *entente cordiale*, is evidently determined not to lose sight of the necessity for creating a closer bond of union between Scotland and England. Next month the RAILWAY MAGAZINE will illustrate the Caledonian Railway's new vestibuled excursion rolling stock, that will be used in the above weekly excursions between Euston and Scotland.

G. BOYD HUTCHINSON.



Photo] [*Mr. Tom M. L. Neish.*

CALEDONIAN RAILWAY.

No. 123, the 7 ft. 'Single' employed in the "Race to Edinburgh" in 1888, hauling the General Manager's Special near Ninewells Junction, on May 4th, 1911, after Mr. D. Matheson's inspection of Dundee Harbour.

Aug: 1914

Pullman Cars on the Caledonian Railway.

In our last issue brief mention was made of the introduction of Pullman Cars on the Caledonian Railway, and two illustrations were reproduced. Further particulars, for which we are indebted to Mr. T. Powell, Secretary and Manager of the Pullman Car Co., Ltd., are now available. Sixteen of the cars are on six-wheeled bogies, 12 ft. wheelbase, 41 ft. between centres, and the bodies are 57 ft. long, 63 ft. 10 in. including vestibules and platforms, 67 ft. $5\frac{1}{4}$ in. over buffers, 9 ft. wide in the waist, and 12 ft. 11 in. high from rail level to centre of roof. The exception is the Oban observation car, to which further reference will be made in due course. There are at present three dining cars, " Flora MacDonald," " Fair Maid of Perth " and " Lass o' Gowrie." These replace the dining cars hitherto used on the Glasgow-Aberdeen service. They run on the 7.30 a.m., 10.0 a.m. and 5.0 p.m. from Buchanan Street to Aberdeen, and the 10.5 a.m. (10.35 a.m. from July 1st), 1.10 p.m. (12.50 p.m. from July 1st), and 5.30 trains from Aberdeen. The fourth dining car is not yet in service.

These vehicles are unique in that they serve both first and third-class passengers, and that no supplement is charged. In furnishing there is no difference, but the two saloons into which it is divided accommodate respectively eighteen third-class and twelve first-class passengers, The tables are arranged on either side of a gangway, with seats for four at each on one side and for two on the other. Movable armchairs are provided, upholstered in green morocco. The well-equipped kitchen and pantry are at one end. The kitchen walls are lined with unpainted aluminium, ensuring utmost cleanliness, and the floor is covered with " Decolite " (supplied by Bell's Asbestos Co., Ltd.), a material which is now being extensively used on all the principal railways.

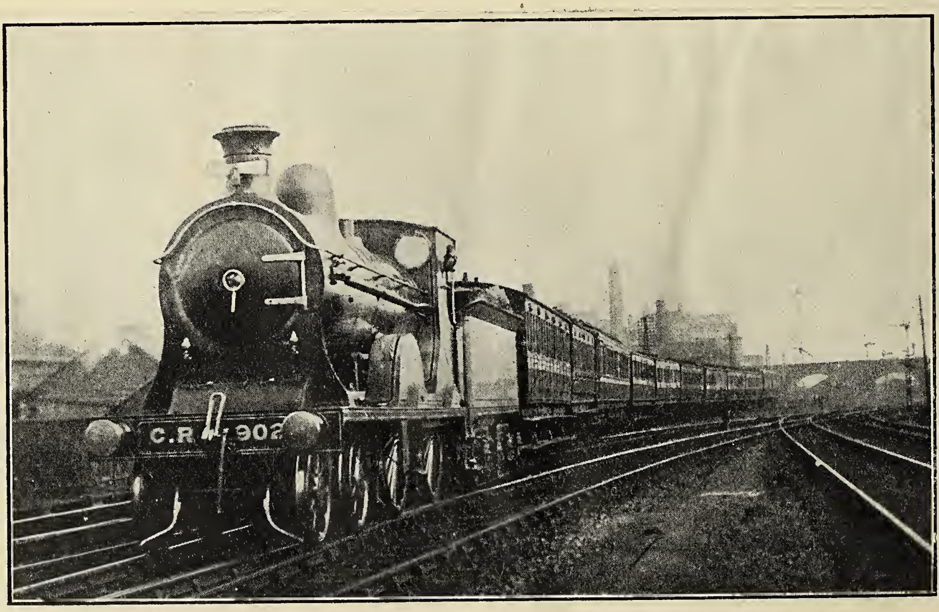
Interior finish is mahogany, veneered and polished, and with inlaid panels. The " Flora MacDonald " is decorated in the Adams style, with white ceilings including carved mouldings and enrichments finished in ivory tone. The " Fair Maid of Perth " is ornamented in the Louis XVI. style, with quartered centre panels including festoons of roses forming ovals. The " Lass o' Gowrie " is decorated in the Pergolesi style, and includes specially selected " curl " mahogany and decorative Pergolesi enrichments.

All the cars are painted standard Pullman colours, dark amber below and cream or ivory tint above. Vestibules, corridors and lavatories are panelled in mahogany. Equipment and staffing of these cars, as also of others to be referred to, is entirely under the direction of the Pullman Car Co., Ltd.

The Buffet cars are now running on the more important express trains between Glasgow and Edinburgh, and other express services, including a buffet car on the " Tinto " residential express between Glasgow (Central) and Moffat, and on the " Strathearn " residential express between Glasgow (Buchanan Street) and Crieff. On these services the cars are reserved for first-class passengers and a supplement of 1s. is charged for each journey. Twenty-one passengers are carried, and the tables are arranged with one armchair at each side of each. In the larger saloon there are three tables on one side and two on the other (owing to the entrance door at that side from the corridor alongside the kitchen). The other saloon has four tables, and in the corner is a private compartment for four passengers, which can be reserved when desired. Decoration and equipment is substantially the same as that already reviewed, varying in particular vehicles according to the style adopted. Between Edinburgh and Glasgow the " Mary Beaton," " Mary Hamilton," and " Annie Laurie " are now in use and the " Mary Carmichael " and " Mary Seaton " will shortly follow. Other buffet cars will be the " Helen MacGregor," " Duchess of Gordon " and " Baroness Nairne." The full complement is twelve of this type.

For use on the 8.0 a.m. Buchanan Street-Oban service and the return at 4.15 p.m. (5.0 p.m. October-June), the observation car " Maid of Morven " is being provided. This is on four-wheeled bogies, 8 ft. wheelbase, 39 ft. 5 in. between centres, 54 ft. $1\frac{5}{8}$ in. long over body, 59 ft. $4\frac{1}{4}$ in. over vestibule, and 8 ft. 11 in. wide. This car will be run at the end of the train and turned between journeys. At the rear is a large circular-ended compartment, with large observation windows at the sides and end, and has movable armchairs, eight at four tables, two on each side and six independent. The other compartment has four tables, three for two passengers each, while the fourth is extensible so that it can be made to serve an additional seat placed against the kitchen wall. The car is completed by the kitchen and lavatories. This car will be subject to a supplementary charge of 2s. 6d., and is being very elaborately equipped by Messrs. Waring and Gillow.

A feature of all these vehicles is the fact that they are electrically lighted on the "Vickers" Single Battery System, which system has been adopted by the Pullman Co. as their standard. Each car is equipped as an independent unit, but in addition to the ordinary hand-operated main switches, magnetic switches are provided with through connections, so that in the event of two or more cars being run together, the lights in the whole of them may be controlled from any individual car. The illumination of the cars has been carried out on a somewhat liberal scale; the buffet cars have each a total of 848 candle power, the dining cars each 832 candle power, and the observation car 816 candle power. In addition to this a special lamp fitting is placed over each of the outside doors to illuminate the steps when passengers are entering or leaving the car. Provision is also made for individual control of the lights, according to passengers' requirements. Variation in the number of lamps burning is, however, compensated for by the special regulator employed, so that the normal voltage of 24 is in no way affected whatever the number of lamps in use. Exhaust ventilating fans, also run on Vickers system, are fitted throughout by means of which the air in the cars is kept perfectly fresh. The special feature of these fans is that they are sunk in the roof and in accordance with the Pullman Company's latest practice are completely concealed by means of ornamental grids, which is a considerable improvement over the arrangement usually adopted, and, moreover, affords a more pleasing finish to the interior of the cars.



Photo] CALEDONIAN RAILWAY. [*Mr. H. Gordon Tidey.*

Euston-Glasgow Dining Car Express leaving Carlisle; 4-4-0 Locomotive No. 902.

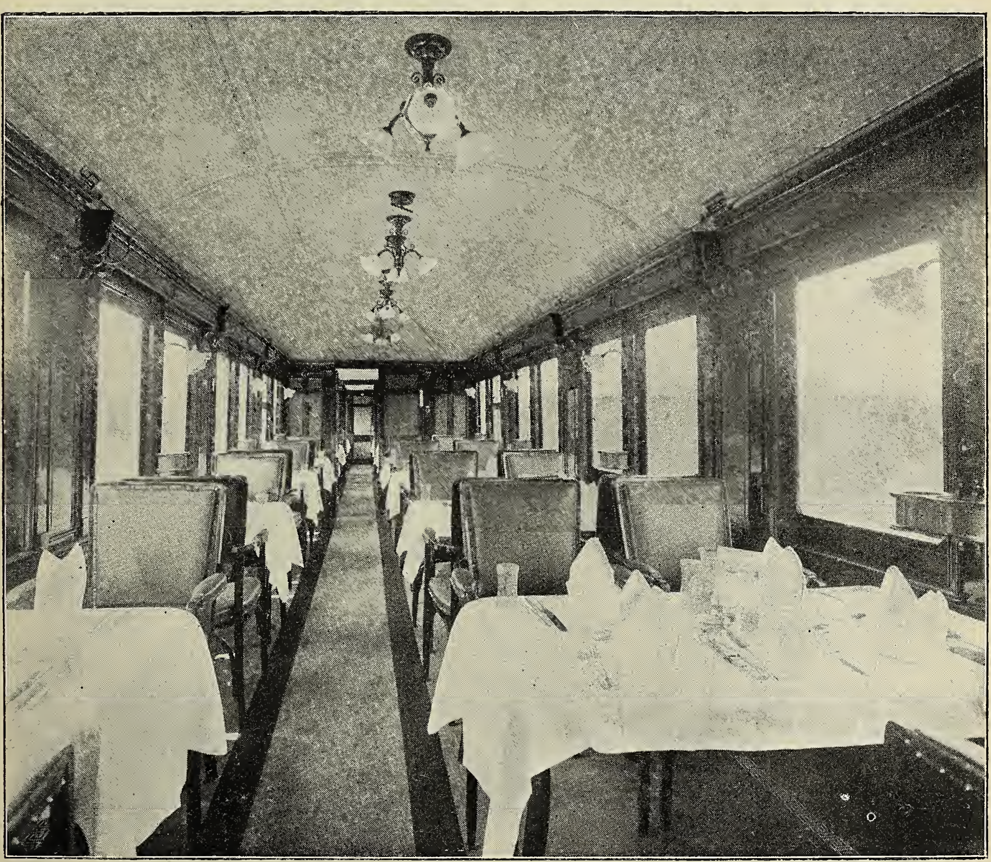
July 1909

World-Famous Trains.

THE 2 p.m. WEST COAST EXPRESS.

TRAINS are famous for various reasons, such as speed, punctuality, length of journey, antiquity, etc. Although the 2 p.m. West Coast Corridor Express can claim to be famous under three of the headings we have enumerated, as a matter of fact, its chief right at present to the title of a 'world-famous train' is not based on any of the good and sufficient reasons we have quoted, for the 2 p.m. *ex* Euston is famous because it is one of the most luxurious trains in the world.

The train is more than famous, it is popular; indeed, it is one of the most popular trains running, and this popularity is not to be wondered at, seeing that the West Coast management has so studied the convenience of travellers to and from Scotland, and has provided such luxuries in the train in question, that a long railway journey—when performed in the 2 p.m. West Coast Corridor Express—becomes a pleasure.



Photo] [*Bull, Austin & Co., Ltd.*

THIRD-CLASS DINING SALOON.

There are travellers who find it advantageous to journey to and from Scotland by the night or morning trains, as circumstances necessitate, but passengers who travel by the 2 p.m. enjoy many advantages that the hours of departure of earlier and later trains render impossible to travellers by the morning and night trains.

The business man can do a long morning's work in London, Glasgow or Edinburgh, journey by the 2 p.m., and arrive at his destination the same night. Similarly travellers from distant suburbs, or even from places much further afield, can breakfast at a reasonable hour, and then without rush or hurry perform various duties, travel to town, and be in good time for the 2 p.m.

The train — notable before — became famous in July, 1892, when a revolution occurred in the West Coast Anglo-Scottish services; prior to this date the needs of the 'inner man' had been neglected by British railways. A hasty snack at a refreshment room during a few minutes' wait at a station *en route*, a tea, or luncheon basket, and the 20 min. dining or lunching interval at Preston was the measure of convenience provided by our railways for 'feeding the brute' and for satisfying the claims of appetite of the more delicate sex. The revolution of July, 1892, consisted in making the 2 p.m. a corridor dining car train. This innovation was a great advance on the then existing travelling facilities. Passengers took their seats at Euston (or Glasgow), and as soon as the express started on its long journey, they were enabled to enjoy the novelty of lunching whilst travelling; a few hours later tea was served; and later still, dinner was partaken of. It was a bold experiment, but fortune shone upon the venture, and the 2 p.m. became famous—and popular.

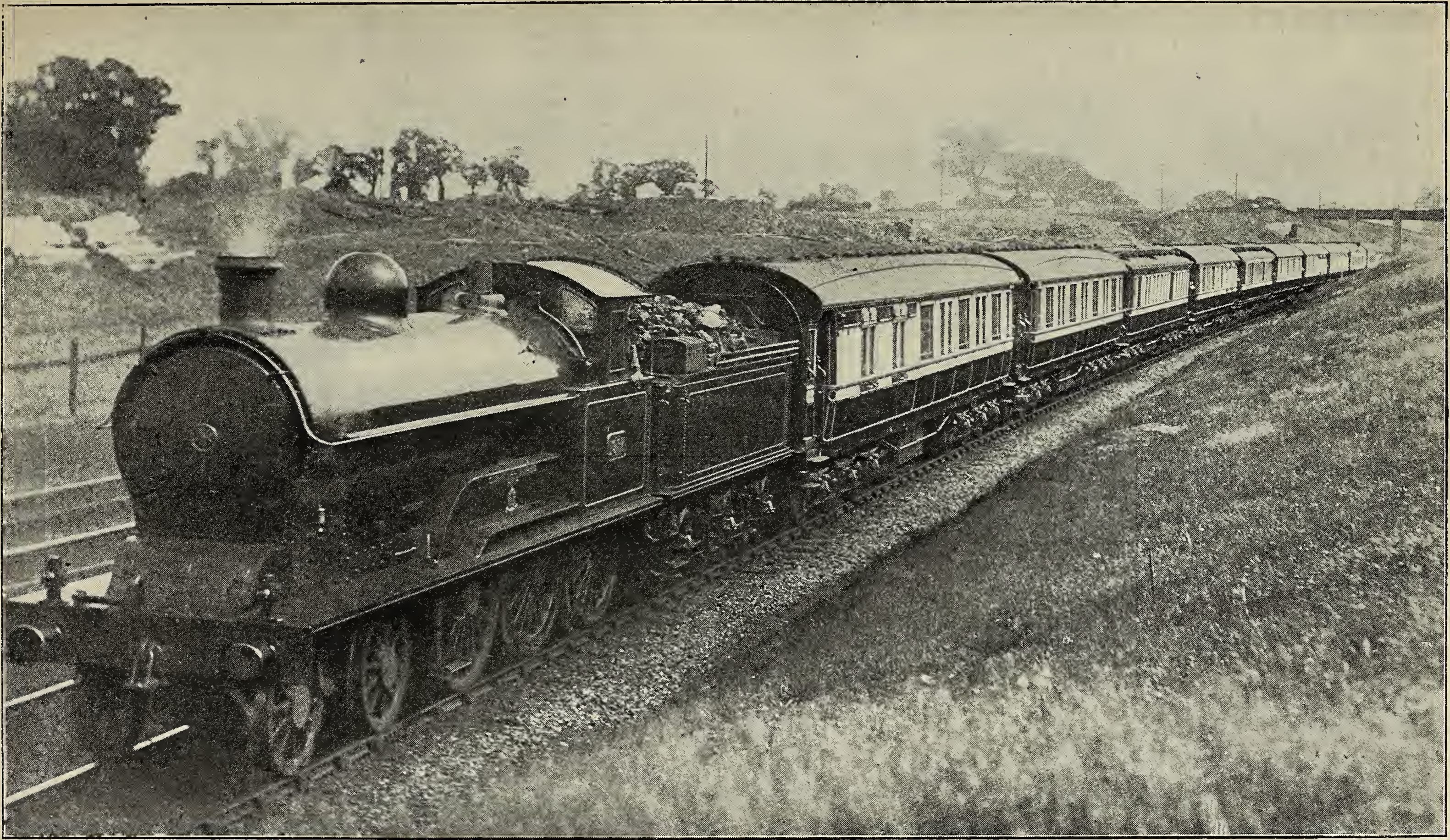
The popularity was well-deserved. To many people a railway journey of 8 hours or more was an unpleasant experience; reading, card-playing, smoking, palled upon them, but with a corridor train and restaurant conveniences, the discomforts of the journey disappeared. An hour over lunch, half that time over the tea cups, and the sum of those two at the dining table occupied some 35 per cent. of the time spent on the journey, and then the novelty of being able to stretch one's legs in the corridor further assisted in killing time—no wonder the 2 p.m. became famous—and popular!

Photo] [Bull, Austin & Co., Ltd.

LOADING PASSENGERS' LUGGAGE AT EUSTON.

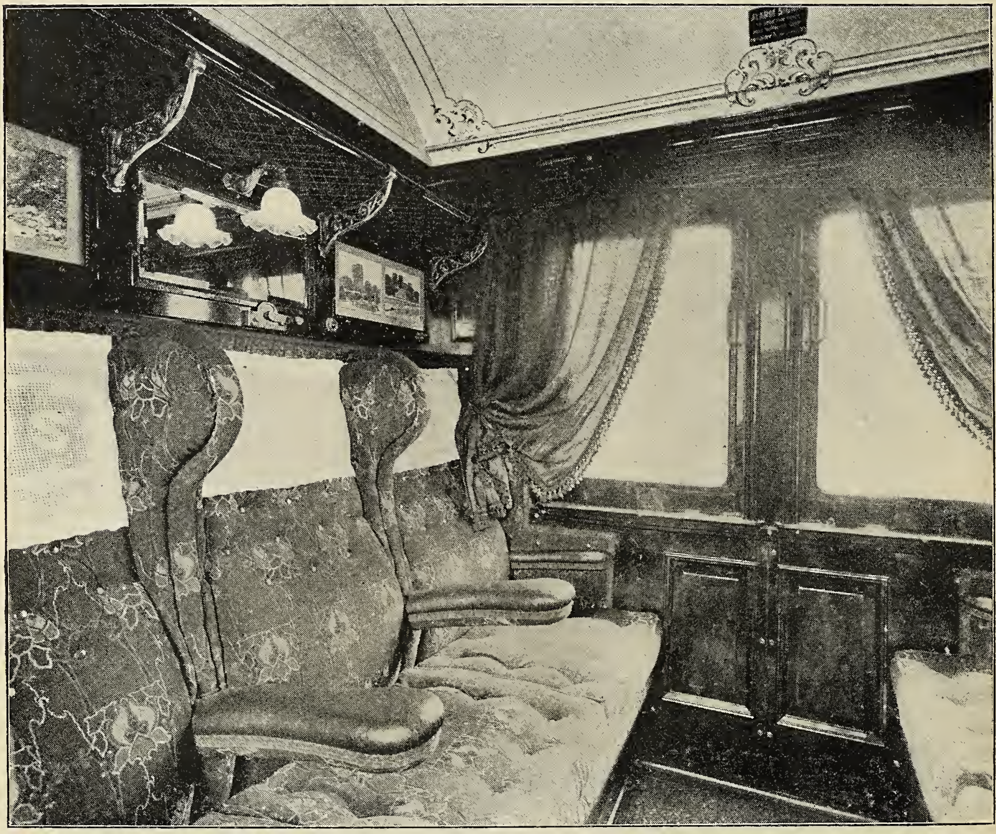
The 2 p.m. of 1892, so far as rolling stock and equipment are concerned, was quite a different train to the palatial 2 p.m. of the year of grace 1909, yet the 8-wheel radial coaches of 26 years ago, some 42 ft. long and 8 ft. wide, with meats cooked at the refreshment rooms and placed on board just previous to serving, were sufficiently novel to make the train famous. Moving with the times, the London and North-Western Railway provided larger, heavier and more luxurious rolling stock as improvements were developed; but it was left to 1908 to witness the introduction of rolling stock of dimensions, weight, and, above all, of luxury unequalled in ordinary daily service.

The complete train consists of 8 coaches, each 65 ft. 6 in. long and 9 ft. wide, the



2 P.M. WEST COAST EXPRESS AT FULL SPEED NEAR HARROW, HAULED BY 4–6–0 LOCOMOTIVE *Glendower*, NO. 1987.
This instantaneous photograph was specially taken for illustrating this article by Mr. F. C. Mackay on May 31st, 1909.

entire length over buffers being 556 ft. With the exception of the two dining cars, which have the favourite clerestory roofs, the tops of the coaches are built to the elliptical section now standard on many railways. The height inside in the centre of the coaches is 8 ft., whilst at the sides it is about 6 ft. 3 in. Seats are provided for 93 first and 218 third-class passengers, and it is scarcely necessary to add that, in a 'world-famous train' so well-equipped as is the 2 p.m. West Coast Dining Car Express, during the busy season full loads are carried. Exterior doors to the compartments or corridors are absent throughout the train, access and egress being obtained by means of vestibules at each end of the coaches, each transverse vestibule being provided with a door on either side.



Photo] [*Bull, Austin & Co., Ltd.*

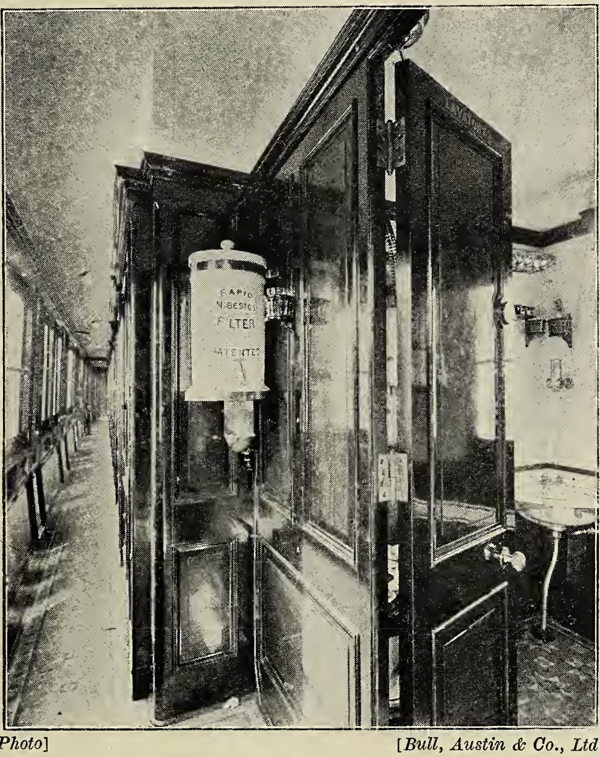
INTERIOR OF FIRST-CLASS COMPARTMENT, SHOWING THE LARGE WINDOWS.

The size and power of the locomotive have grown with the increase of weight and length of the train; the graceful and speedy *Lady of the Lake* class of engine has disappeared, so have the 'Precedents,' 'Jumbos,' and most of the three and four-cylinder compounds: each type of these engines in the heyday of its popularity added to the fame of the 2 p.m. West Coast Express, for, after all, much of the glory of a 'world-famous train' is derived from the prowess of its 'iron horse.'

The present 2 p.m. will not be 'found wanting' in this respect. Mr. Whale, in designing his monster *Experiment* class of 4–6–0 locomotives, had well studied the work that the hauling of a train of the weight of the present 2 p.m. at a high speed requires of a locomotive, and his mammoth engines have shown themselves well able to fulfil the heavy daily task required of them, and still retain a reserve of power to overcome the increased resistance of wind and rain, as well as to be sufficiently powerful to haul additional coaches when the exigences of the traffic require the train to be strengthened.

Now let us take a journey by this world-famous train. All is bustle and excitement on No. 6 platform at Euston, from which the 2 p.m. regularly departs. As the hands of the clock point to 2 o'clock, the passengers take their seats, friends crowd around to take a last farewell, the crowd of *locomotivacs* beside the engine—a sure sign of popularity of a train—becomes visibly excited, the time of her departure arrives, the guard waves his flag, the driver operates his whistle and opens his regulator, and so the 2 p.m. starts on her journey to the North, accompanied to the end of No. 6 platform by the crowd who worship at the shrine of *Glendower* and her sister 4–6–0's.

On board, we find lunch is at once served, and the busy city man can for once in a way enjoy a leisurely midday meal, the pleasure of the repast being added to by the novelty of the circumstances, and further heightened by the excellent *cuisine*, admirable service and dainty appointments of the train.



Photo] [*Bull, Austin & Co., Ltd.*

LAVATORY AND CORRIDOR, WITH FILTER.

Whilst lunch is being served, we have opportunity to observe that the dining car (of which there are two in the train) is divided into two saloon compartments, the first-class being at one end and the third-class at the other, with the kitchen and the pantry in the centre, and entrance vestibules at each end.

The first saloon compartment is 17 ft. 4 in. long for 15 passengers, and the third-class compartment 23 ft. 7 in. long for 21 passengers, giving a total of 36 for one dining car, or 72 for the two dining cars to dine at the same time. The internal wood framing of the first-class saloon compartment is polished walnut, with panels in mahogany banded with green ebony and tulip wood. The cornice and blind hoods are deep charrior or carved mouldings, the dado panels are in Italian walnut, and the dining tables in mahogany covered with red vulcan leather. The roofs are covered with Lincrusta enamelled white, with the floral design picked out in bright enamel.

The third-class saloon compartment is fitted up with polished teak framing, and panels in light oak, with mahogany mouldings. The dining tables are in teak, covered with brown vulcan leather, and the roof is covered with Lincrusta, with floral design and painted enamelled white. The seating in both saloons is arranged with movable dining-room chairs with arms. Those for the first-class are bent-wood in dark mahogany, and upholstered with maroon leather for seat, back, and arm rests; while those for the third-class are framed dining-room chairs, with arms being in light oak, and upholstered in brown American leather.

The movable dining tables on one side of the centre passage are made to dine four persons, and for two persons on the other side. They have brackets at one end to fix on the side of saloons, and a folding leg at the other end. The tables at the extreme ends of the saloon in each compartment are made to fold downwards.

Above the blind hoods are fixed parcel racks of brass, in oxydised copper, with phospher bronze netting. The blinds, both for first and third-class saloon compartments and corridors, are of Holbein tapestry, mounted in blind hoods.

The first-class compartment floors are covered with Wilton pile carpet, laid on felt, with horsehair matting down the centre.

The third-class floors are covered with cork linoleum, with horsehair mat down the centre.

The saloons are installed with electric light on the Stone's system, with lamps suspended from the roof and bracket lights over the dining tables. They have also electrical communication between saloons and attendant.

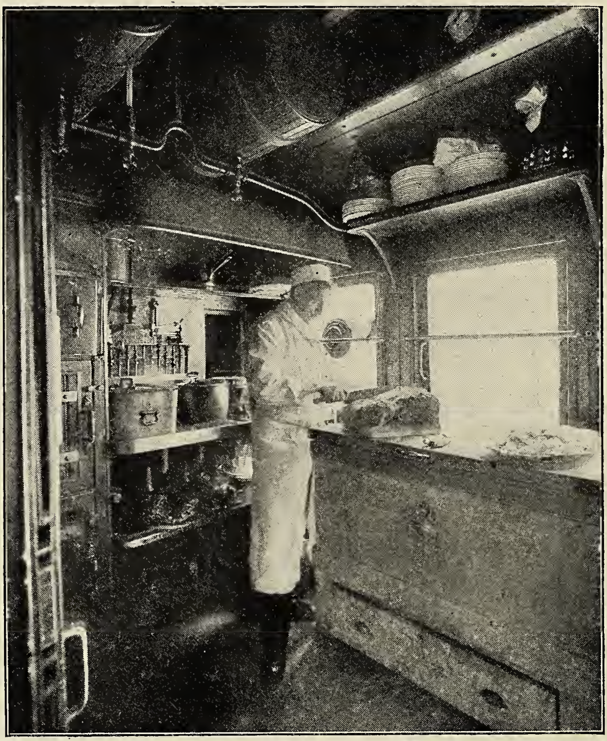
The saloon all through is specially ventilated with an entirely new system, viz., the air is drawn from the outside and passes through a water filtering box, which excludes all dust from the air, and at the same time is cooled to the temperature of the water. The air passes through a metal duct fixed above the side metal luggage rack to the far end of the saloon compartments, and also has openings equally spaced with hit and miss slides to regulate the outlet, or to close the same.

At the side of the filter-box is placed an electrically-driven Sirocco fan, which draws and delivers the air to the metal duct before-mentioned. The motor is arranged for three speeds, viz., *slow*, *medium*, *fast*, and is under the control of the attendant. It is also further arranged to deliver hot air in winter, through the same duct, the air being heated by passing through a steam coil box, having steam and waste valves for this purpose.

For roof ventilation there is also fitted torpedo vents at the side of clerestory roof, which are operated by lever handles by the attendant or passengers when required. Instructions are placed in the butler's pantry, in which is the control of all electric light and calls for dining saloons.

The saloons are also fitted throughout with the direct system of steam heating—with heaters at side of saloons on the floor, and covered over with metal grids and valves to regulate the heat.

At the end of our repast we shall have an opportunity of inspecting the kitchen and butler's pantry, which respectively are 10 ft. 6 in. and 7 ft. 6in. long, with corridor 1 ft. 8in. wide at the side connecting the first and third-class compartments. These 'service' compartments are framed in teak, with panels in light oak, moulded in for the furniture, the walls and roof being covered with light vee-jointed oak. The fittings in the kitchen are: Gas cooking range, with combined hot closet, grill and water-heater, also Bunsen burner rings and hot plate; two wash-up sinks, folding table, cupboards, and refrigerator box. The butler's pantry contains two cupboards for dining service, cruets, cutlery, wine, etc.; sink and refrigerator, which serves as a table top, and also racks for glasses, which are carried over the top of the side lights. The water for the kitchen and pantry is carried in overhead tin-lined copper cylinders suspended from the roof. These are also cased in light oak, with brass bands to secure the oak strips.


Photo] [*Bull, Austin & Co., Ltd.*

THE CHEF AT WORK IN THE KITCHEN OF THE DINING SALOON.

Whilst we satisfy the 'inner man,' Willesden is quickly reached; here a short stop is made to pick up passengers that have arrived by connecting suburban trains from the City and the north, south and western suburbs of the great Metropolis.

At 2.13 we are again on the move, and *Glendower* commences her work in good earnest, for many miles of 'collar work' lie before her, and she has but 87 min. in which to cover the 77¼ miles that separate Willesden and Rugby, but with such a steed and on such a permanent way, even when the elements are unpropitious, our experienced driver and willing fireman know that if the road be clear the arduous task will be duly accomplished. And so it is, for the watchful signalmen along the line have made the necessary arrangements for a clear road for this world-famous train, and Rugby is reached more likely before than at 3.40, which is the time we are due there. A stop of 4 min. enables the careful driver to 'take the temperature' of his faithful steed, and at 3.44 we start again on our smooth-running rush to Bonnie Scotland.

The gastronomical effects of the well-served luncheon are favourable to a saunter through the train, and the perambulation gives us an opportunity to observe the taste and ingenuity that has been expended upon the 2 p.m. West Coast Corridor Express, so that passengers can travel in comfort and with the absence of that fatigue that is inseparable from a long sojourn in some railway vehicles.

Amongst the aids to comfortable travel, we notice that ventilation is provided by means of drop-lights and torpedo ventilators in the roofs of the various coaches.

The entrances to all the compartments are from the corridors, by means of sliding doors hung on frictionless rollers, which obviates all rattling, and the doors, when closed, are dust and draught proof.

In the corridors are drop-lights, and large observation lights on the car side, which are surrounded by polished moulded mahogany frames. Across these observation lights, brass oxydised silver safety bars are provided, and serve as supports when walking along the corridor.

The corridor floor is covered with india-rubber tiling for first class, with bordered pattern.

Electric lamps, at convenient distances, are placed down the centre of the ceiling, and all the framing and panels, from the cornice moulding downwards, are polished.

The lavatories at both ends of the saloons are provided with an earthenware wash-basin, patent w.c., also brush and comb rack, bottle holder, towel rack, and bevelled-edged mirror in moulded frame. All the fittings are in oxydised silver metal, and there is also hot and cold water supply.

Let us take a peep into one of the luxurious first-class compartments, which have two balanced drop-lights, filled in with gauze in the upper part, to fill the opening when the glass is lowered a short distance forming a protection from dust on the car, side. There are also two fixed windows on either side of sliding door, which leads into the corridor.

Three seats are provided on each side of the compartment, with folding arm-rest for divisions, and trimmed fixed elbows at the sides. The seats are trimmed with figured green Blenheim moquette. Over the seats are self-contained luggage racks, with brackets and cord netting for small parcels. Pictures are provided between the bottom of the racks and top of seat backs.

The windows have adjustable blinds, of figured brown and gold tapestry, fixed in mahogany hoods, with front of hood hinged for adjusting blinds. In addition, there are green figured merino curtains, with fringe, which can be drawn over windows instead of drawing blinds down, which gives the compartment a cool appearance in sunny weather.

The floors of compartments are covered with bordered cork linoleum, with loose rug laid down the centre.

Electric light lamps are provided in the ceiling, and for convenience when reading, they are also fixed in brackets over seats in oxydised silver, enabling the studious traveller to get the light in the most convenient position, and so add to the comfort of the journey.

All the compartments are heated with the direct steam heating, the heaters being placed at back under the seats, with valves, by means of which passengers can turn the heat on or off by a lever placed under the mirror above the trimmed back.

The train carries only first and third-class passengers, and the accommodation provided for the latter is on an extremely generous scale.

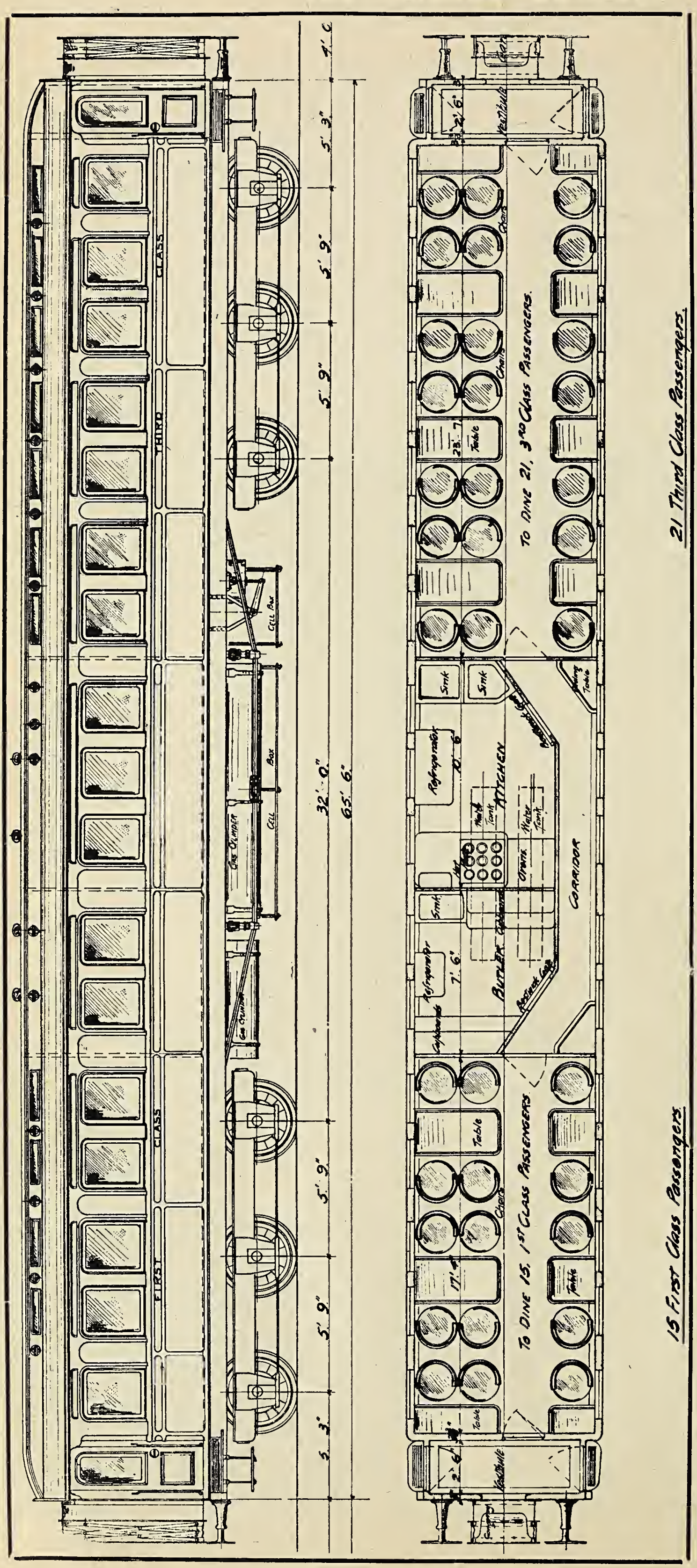
The seats, which are trimmed in crimson and black velvet, accommodate 4 passengers each side.

Balanced blinds are provided for doors and windows, carried in hoods.

Electric light is installed in the roof, with three-leaf single fittings on the Stone's system.

Floors are covered with bordered cork linoleum (key pattern border).

The walls are framed with teak, with upper and lower panel in oak. On the compartment sides sliding doors are provided,



ELEVATION AND PLAN OF ONE OF THE DINING SALOONS OF THE 2 P.M. WEST COAST EXPRESS.

running on frictionless rollers encased in ornamental teak hoods. All the metal furniture, viz., handles, stops, etc., are in oxydised copper.

Special attention has been given to the technical service portion of the train.

The guard's entrance doors open inwards, and are provided with long commode handles for entering and leaving the break end.

The interior of the guard and luggage compartments is open throughout, they have two pairs of folding doors opening outwards on each side for loading and unloading luggage. This arrangement facilitates the handling of the luggage. Another improvement is in the floor, which has oak slats fixed lengthways of the van, except opposite the luggage door openings, where they are laid crossways, so that the dust can be swept lengthways to the door cross slats, which greatly assists in cleaning the floors. All side doors have drop-lights for ventilating and admitting daylight to the interior, supplemented by a row of narrow openings on either side filled in with plain glass. Guard's end look-outs are also provided on each side of the gangway. There is a shelf about 4 ft. high at end of van, fixed on end partition, for less bulky luggage.

A locker for valuable parcels is provided on one side, and on the opposite side is a trimmed guard's seat, close to the guard's door, and protected from draught by large fixed wings, and further arranged for fixing wire dispatch racks. The deal boarding on the sides of the walls of break ends are arranged to ensure cleanness and ease in repairing. The guard's end is supplied with hand-break, in addition to the automatic breaks. This hand-break will operate all the blocks on the 2 six-wheeled bogies upon which the vehicle is mounted. Means are provided at this end of the van for the guard to regulate the supply of steam to the passenger compartments throughout the train. The whole of the roof inside is painted white, and the sides and ends are painted green.

The break ends are lighted by electric lamps fixed in the roof, together with deck-light lamps at the ends of break. The whole of the train has each wheel breaked, and is fitted with the automatic vacuum break for use on the London and North-Western Railway and the Westinghouse break for operation on the Caledonian Railway. The breaks work in conjunction with each other, and are under the control of the engine driver and guards.

Whilst we have been appreciating the luxury and convenience of the 2 p.m. West Coast Express, this "world-famous train" has been speeding over the Trent Valley line, and stays not till Crewe appears, the 75¼ miles from Rugby having been covered within the scheduled time of 89 min. During our brief stay at the Mecca of the *locomotivac*, *Glendower* comes off, and is quickly replaced by her sister, *Greystoke*.

At 5.19 the new steed commences her task, and whilst the travellers are imbibing the contents of the 'cup that cheers,' the 2 p.m. is pursuing her journey to the North at the rate of a mile a minute. Rushing through Warrington, Wigan and the surrounding districts that are more concerned with the goods and mineral departments of the London and North-Western Railway than with the passenger, we at 6.18 draw up in Preston joint station. Here the enginemen may fill the tender of *Greystoke*, but need pay no heed to the notice on the water column which decrees that "Lancashire and Yorkshire and all other drivers other than London and North-Western are required to place a water ticket in this box on each occasion they take water here," for *Greystoke* belongs to the favoured London and North-Western Railway, and water is free to her at the down main platform at Preston.

At Preston the Aberdeen and Whitehaven coaches are detached.

In the pre-dining car days of the 2 p.m. already alluded to, passengers took advantage of the re-marshalling of the train to snatch a hasty meal, but as restaurants on wheels now are an important part of the train, this gamble with our digestion is no longer necessary.

When leaving Euston the 2 p.m. consists of 12 coaches. Next to the engine is the Glasgow portion, consisting of a break-third-class coach, seating 40 passengers in 5 compartments, each 6 ft. 6 in. wide; the lavatory is next the vestibule. Passing through the gangway, we enter a composite coach, with 2 third-class compartments, and 4 double and 1 *coupé* or honeymoon compartment, as it is popularly called, which, although the seat is divided into three places, we may be sure seldom accommodates more than two travellers. There is a lavatory at either end of this coach, and a door in the corridor separates the first from the third-class portion of the vehicle. The third coach is the dining car, already fully described, whilst the fourth is a replica of the first vehicle, but with the break compartment at the opposite end; these four vehicles form the Glasgow portion. Continuing our walk, we enter the Edinburgh dining car, with accommodation as in the Glasgow one; next is a composite, with 4 first-class compartments (7 ft. 6 in. wide), seating 24 passengers, and 3 third-class compartments, with sittings for the same number of travellers. The seventh vehicle is the break composite, with 4 third-class compartments; beyond is the Aberdeen vehicle, which has 2 lavatories, 2 first and third-class compartments, besides the guard's compartment (18 ft. 6 in. in length). The through coach for Whitehaven and that for Knutsford are marshalled at the rear, this making 10 coaches for the whole train, its length being about 680 ft., and weight well over 300 tons.

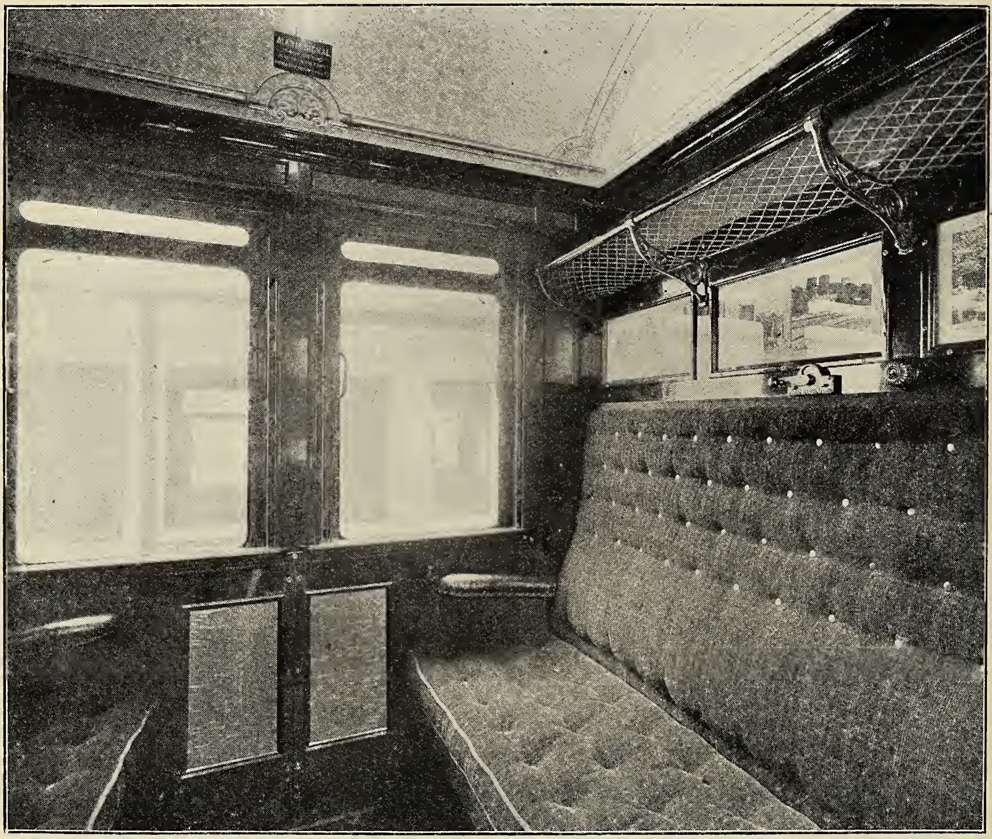
The Knutsford coach was left behind at Crewe. We arrive at Preston at 6.18, and at 6.24 we re-commence our smooth passage to the North. Soon the dining car attendant books seats for dinner, and whilst we are climbing the steep Shap bank, by means of which the West Coast route crosses the

Pennines, and speeding down the far side to the frontier city on the Eden, we partake of our evening meal, and as a result of the well-prepared and well-served dinner which the London and North-Western Railway dining cars afford, we are on excellent terms with ourselves and feel disposed to see much good in humanity generally.

Despite the severity of the gradients over which we have travelled, but 104 min. have been spent in traversing the 90 miles from Preston to Carlisle.

Arrived here, we appreciate an advantage that travellers by the West Coast route enjoy. Only two railways are concerned in our passage from London to Edinburgh, Glasgow, or even far-off Aberdeen; the convenience of three or four railways have not to be studied to enable our train to perform its journey. Here at Carlisle we bid adieu to *Greystoke* and the London and North-Western Railway, but we set forth again on the metals of its partner, the Caledonian Railway, for no ' by your leave ' of running powers are called into use by the passage of the West Coast expresses.

The public time tables* show a stop of but 2 min. for the London and North-Western Railway to come off, and the Caledonian Railway 4–6–0 blue giant to be attached to the train, yet punctually to time we hear the peculiar whirr of the whistle of the Caledonian Railway's locomotive as we start forth on the last section of our 400-mile journey to ' Auld Reekie,' or 401½ miles to Glasgow; either destination includes the ascent of the Beattock bank.



Photo] [*Bull, Austin & Co., Ltd.*

INTERIOR OF A THIRD-CLASS COMPARTMENT.

The Glasgow arrival is at 10.20 p.m., so that 2 hrs. 10 min. are allowed for the 102½ miles; this, however, includes a stop at Strawfrank Junction, south of Carstairs, where the train (due at 9.41) is divided, the Glasgow portion leaving at 9.43, and that for Edinbro' 4 min. after; 2 hrs. 20 min. are allowed for the 101 miles Carlisle to Edinburgh, including the Strawfrank stop, and a locomotive water call at Beattock (unless the train is 'pilotted,' when the stop at the summit, for detaching the pilot, is utilised by the train engine for taking water), so that although the road is hard, when we see the giant that hauls us we understand why competitive routes appreciate that 'discretion is the better part of valour' when a race to Scotland is hinted at.

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* The WORKING TIME TABLES show Carlisle arrive 8.8, depart 8.13.

Passengers in the Aberdeen portion of the train have a longer wait at Preston; an express from Liverpool (with Edinburgh and Glasgow portions) arrives there at 6.25, and one from Manchester at 6.31; the combined trains go forward at 6.40. A stop of 2 min. at Carnforth to detach a through coach from Euston to Whitehaven, which travels hence over the Furness Railway, with 2 min. stops at Oxenholme and Penrith in addition, we run into Carlisle at 8.37, 5 min. later we leave, under the guidance of the Caledonian Railway, at Lockerbie a coach is slipped, Beattock is reached at 9.27, and Carstairs at 10.14. Here the train is divided into three portions, the coaches for Edinburgh leaving at 10.21, and being due at Princes Street at 10.55; whilst the carriages for Glasgow leave Carstairs at 10.17, and arrive at Eglinton Street at 10.55, and at the Central station at 11 p.m. The third part of the 2 p.m. is for Aberdeen, and goes forward from Carstairs at 10.27; at Perth it is attached to the sleeping car train from Glasgow (Buchanan Street), and finally arrives at the 'Granite City' at 3.5 a.m., which this time of year should be early enough for the most enthusiastic Willettian.

There is, naturally, a balancing up train —still the 2 p.m. West Coast Corridor Express. This leaves both Edinburgh and Glasgow at 2 p.m., whilst Aberdeen is left at 10.5 a.m.; so that although the down train may arrive at a somewhat inconvenient time at the northern boundary of the West Coast partners' territory, the corresponding up train from their northern frontier is distinctly a favourite one.

With regard to the times of the train, ever since July, 1896, its arrival at Edinburgh has been 10.30 p.m. In July, 1892, it was due there at 10.55; two years later it had been slowed 2 min., but in July, 1895, it was quickened to arrive at Princes Street at 10.45; 12 months later it fell into its present timing.

The Glasgow timing has shown several accelerations. In July, 1892, the 2 p.m. was a nine hours' train, not being due at the Central station till 11 p.m.; two years later the time was reduced $\frac{1}{4}$ hour; in July, 1895, another 10 min. was taken off, and the next year saw a further 5 min. go by the board. This $8\frac{1}{2}$ hours timing remained effective till October, 1904, when the present schedule of 8 hrs. 20 min. came into operation.

In July, 1892, the arrival at Euston was 10.50 p.m., but a year later the present time (10.45) was adopted, and has remained in operation ever since. Originally the departure from Aberdeen was 10 a.m., but was altered to 10.5 in July, 1896, and still remains.

Photo] CALEDONIAN RAILWAY. [*Mr. Tom M. L. Neish.*

3.30 p.m. Dundee West–Euston Express near Ninewells Junction; 4-6-0 Locomotive No. 913.

The Solway Junction Railway.

The Solway Junction Railway was incorporated by Act of June 30, 1864, to construct a line from the Caledonian Railway, near Kirtlebridge, to the Brayton station of the Maryport and Carlisle Railway, and certain branches in connection therewith. Later, under Act of July 23, 1865, a number of deviations were authorised, and power was given to utilise part of the Glasgow & South Western Railway in order to connect up the Maryport and Carlisle station at Brayton.

It commences at a junction with the Caledonian main line from Carlisle to Glasgow at Kirtlebridge and runs in a southerly direction. The first station on the route is Annan, $5\frac{1}{2}$ miles from Kirtlebridge, and here the G. & S.W. Carlisle-Glasgow main line is crossed. Shortly after passing Annan the line approaches the Solway Firth and crosses by means of the Solway Viaduct. This viaduct is one of the longest in Great Britain, measuring well over one mile from end to end. The track is carried on piers of somewhat light construction thus restricting the loads which can be worked over it. In particularly bad weather it was often found necessary to stop all traffic over the bridge. In 1881, after an exceptionally severe frost, several spans were carried away by ice, and the line was closed for three years to allow of reconstruction of the viaduct.

Photo.] THE SOLWAY JUNCTION VIADUCT, L.M.S.R. [*J. J. Cunningham.*

It had remained in use more or less continuously until the war period, when the fact that required repairs and strengthening could not be carried out caused this section of the line to be closed. Subsequently nothing was done, and the L.M.S.R. recently stated that it was not proposed to reconstruct the viaduct as would be necessary to enable traffic to be reinstated. Consequently, trains have for a number of years past run only between Kirtlebridge and Annan.

On the south side of the Solway Firth, about a mile beyond Whitrigg, the North British (L.N.E.R.) line from Carlisle to Silloth was joined, and, after $3\frac{3}{4}$ miles, left again at Abbey Junction, whence the line proceeded through Bromfield to a junction with the Maryport and Carlisle main line at Brayton, a distance of $21\frac{1}{4}$ miles from Kirtlebridge.

From its opening in 1870, the line was worked by the Caledonian Company, and by the Act of July 15, 1863, the company became owners of the northern section, between Kirtlebridge and Annan, now part of the L.M.S. system.

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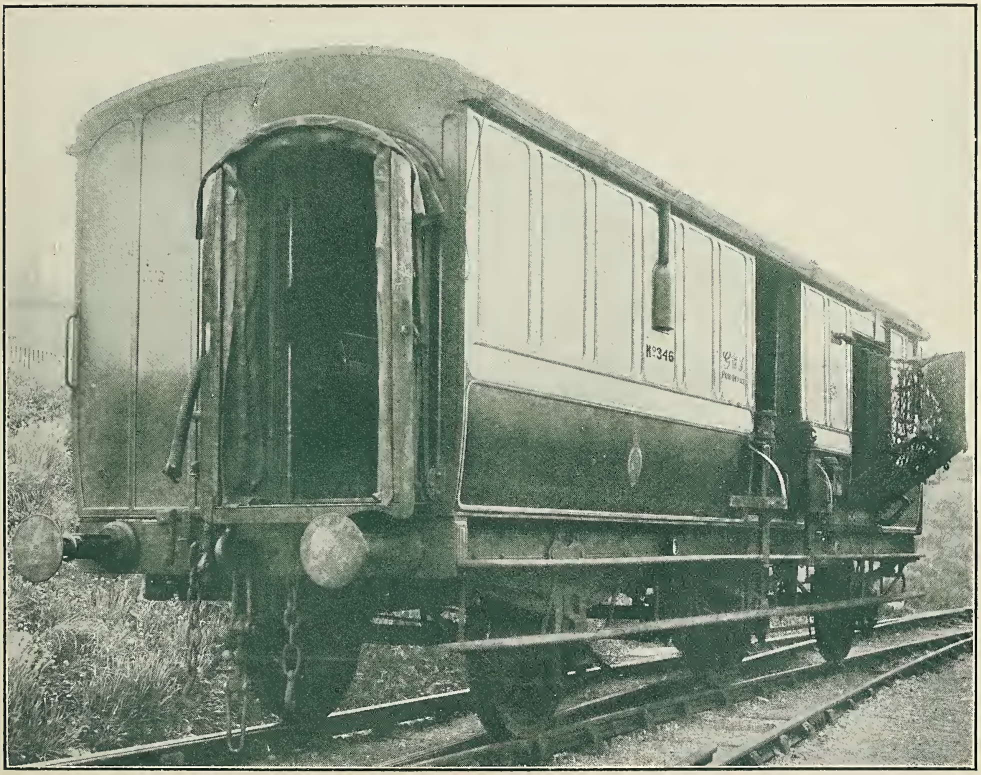
The West Coast Special Postal Express.

By J. S. Ramsay.

We have long been accustomed to think and speak of those shining ribbons of steel which connect Euston and Aberdeen as *the* Royal Mail Route *par excellence*, but probably few people, with the exception of those immediately concerned, realise the extent and importance of the postal services rendered by the railway partners on the West Coast route.

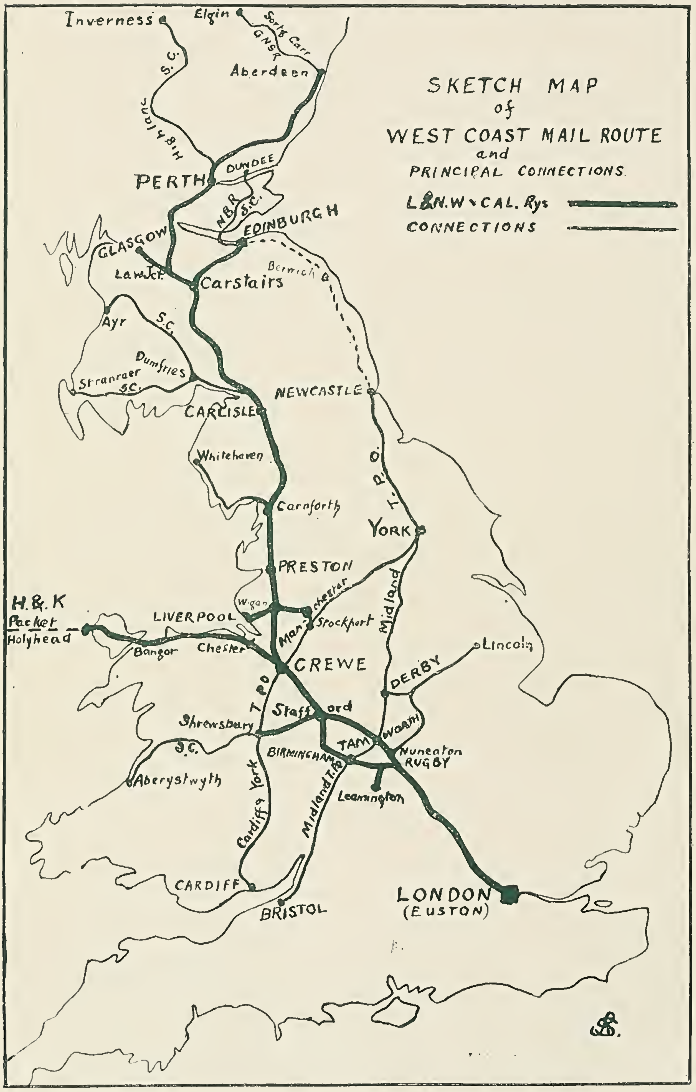
It may not, therefore, be without interest for the general reader to trace the rise and progress of a connection which has operated with signal success for the benefit of the whole community.

The history of the London and North-Western Railway is usually taken to



SIX-WHEEL WEST COAST TRAVELLING POST OFFICE, WITH PICK-UP APPARATUS EXTENDED.

begin with the Manchester and Liverpool Railway, which opened on September 15th, 1830. Soon afterwards the mails were conveyed by railway for the first time, though it was not till 1837 that the iron road began to play a really important part in our postal economy.



Special interest attaches to the first travelling post office, or 'moving post office' as it was then called. This consisted of a "converted" horsebox, temporarily fitted up for sorting purposes, which began to run on the Grand Junction Railway between Birmingham and Liverpool on January 6th, 1838. The experiment proving successful the Travelling Post Office became a permanent institution, and orders for four vehicles were placed with the Grand Junction Railway—afterwards amalgamated with several other lines to form the London and North-Western Railway. The dimensions of the carriages were height 7 feet, length 16 feet, width 7 feet 6 inches. Each ran on four wheels and weighed 4 tons 2 cwts. Accommodation was provided for two clerks and four guards. The gross weight was estimated at about 5½ tons, and for this the railway company at first maintained six wheels were necessary. Oil roof lamps were used, and it was no uncommon thing for the oil to drip down on the sorters beneath.

The railway authorities further protested that the size of the carriages would offer so much resistance to the wind as seriously to retard speed, and they sought to be indemnified against accidents arising from running mail trains at night.

The trains to which these carriages were attached took over twelve hours for the journey between Euston and Preston *via* Birmingham, a distance of 217 miles. As the bank between Euston Station and Chalk Farm was too steep for the locomotives of those days the carriages were hauled up or let down by means of ropes actuated by stationary engines, the locomotives taking their places at the latter point.

There can be no doubt that the detail of travelling post office work which lays most hold on the imagination is the exchange of mail bags while running at high speed. This indeed forms a link with the old coaching days, and is a survival of the system of handing over mails to the guards of passing coaches, which slowed down, but did not stop, to receive them. With the advent of the railway the experiment was made of hoisting the bags to the guard on the end of a long pole, but this method was foredoomed to failure.

To Nathaniel Worsdell,* carriage builder to the Grand Junction Railway, belongs the credit of patenting the first form of apparatus for use with moving trains. It consisted of three projections or prongs at the end of a movable bar, worked from a seat at the back of the railway carriage. The middle prong, which pointed towards the engine, picked up the bags from the wayside station, while those for despatch were suspended from two other prongs fixed in an upright position at right angles to the bar. The roadside apparatus was somewhat similar in design, and embodied the same principles of working.

Worsdell's patent was submitted to the Post Office in January, 1838, just after the Birmingham and Liverpool sorting carriage began to run experimentally. The price asked, viz. £5,000, was considered prohibitive, but the Department offered £500 for the right to use the apparatus.

Worsdell declined this, and suggested a payment of £1 per mile, per annum, or a lump sum of £1,500. None of these offers was, however, entertained.

In the meantime experiments had been made with a receiving net and despatching arm—or crane, as it was called—devised by Mr. John Ramsey, an official in the Missing Letter Branch of the Post Office. These were found to be more suitable than any adaptation of Worsdell's patent could have been, and accordingly they were fitted to the first permanent travelling post office carriages, which were built by Worsdell himself in his capacity as carriage builder to the Grand Junction Railway.

This apparatus was afterwards improved in 1848 by Mr. John Dicker, an Inspector of Mail Coaches, and it exists to-day very much as he left it. [A description of the working of the modern apparatus appeared in THE RAILWAY AND TRAVEL MONTHLY, Vol. 1., page 138.]

On September 17th, 1838, the London and Birmingham Railway was opened, thereby joining the Grand Junction and North Union lines and affording a direct and continuous route to the North. A Travelling Post Office was first established from London to a point north of Bletchley, and was shortly afterwards extended to Preston. Two mails were despatched from London (Euston Station) daily, the first, or Day Mail, at 11 a.m., and the Night Mail at 8.30 p.m.

SORTING LETTERS IN ONE OF THE EARLY WEST COAST TRAVELLING POST OFFICES.

The early experiences of clerks in the Travelling Post Offices were not always enviable. "Sir," wrote two officers to their chief, under date, Birmingham, February 16th, 1838, "It becomes our painful duty to report the burning of the Carlisle mail bag." The circumstances as detailed by Mr. Baines in "Forty Years at the Post Office" were as follows:—The London mail for Liverpool had been duly received by road, and sent on by train from Birmingham, but the coach with the

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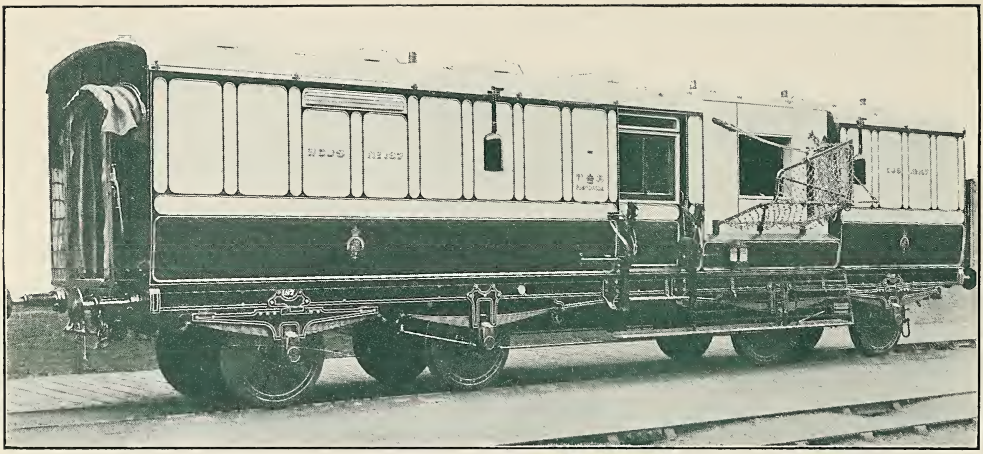
* Nathaniel Worsdell was a Quaker, hence the omission of the usual title of courtesy before his name.



EIGHT-WHEEL WEST COAST TRAVELLING POST OFFICE, WITH RADIAL AXLES.
This was the standard type of West Coast Travelling Post Office, prior to the introduction of the present bogie vehicles.

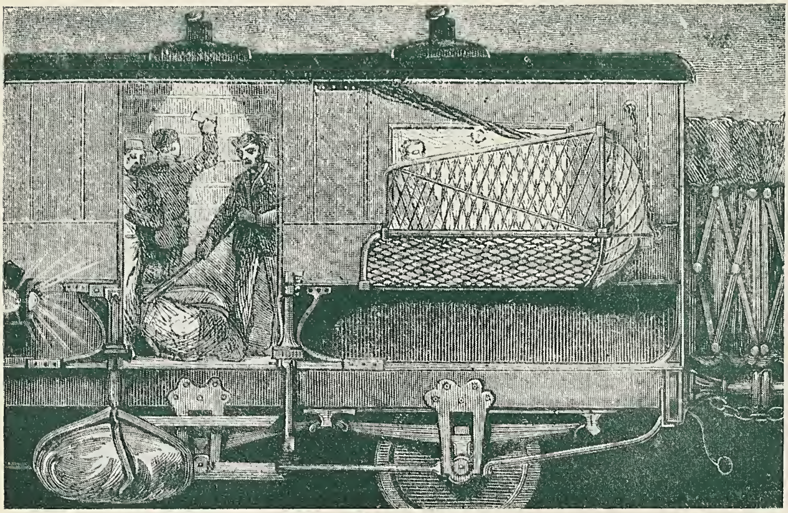
mail for Carlisle had been upset on the way, and the bags only came to hand by the Manchester coach after the train had gone.

The two clerks promptly procured an express engine, fastened the bags on a "lorry" between the engine and the Post Office carriage, and set out for the North. At Whitmore the furnace bars of the locomotive were found to be burnt through and a stoppage ensued. At Crewe the cry of fire was raised. A hot cinder from the damaged furnace had fallen on the Carlisle bag and set it alight. The conflagration was put out, and, after repacking the damaged letters, as well as circumstances would permit, the train set out for Warrington.

But their troubles were not yet over. "The engine was in such a state of inefficiency that we were detained at four different parts of the journey, and at last were obliged to let all the water out of the cistern, into which the tender-man descended to find out what was wrong."

Coming back, things were no better, for the "fire and grate of the engine gave way altogether and were precipitated to the ground, nearly causing the train to be turned off the tram." Another train, however, overtook them and was happily able to push them on to their destination.

About the year 1838 the speed of a mail train was only some twenty miles an hour, and at a somewhat later period the mails took 11½ hours for the journey from London to



WEST COAST EIGHT-WHEEL TRAVELLING POST OFFICE, WITH RADIAL AXLES, SHOWING STAFF PLACING MAIL BAGS FOR DELIVERY.

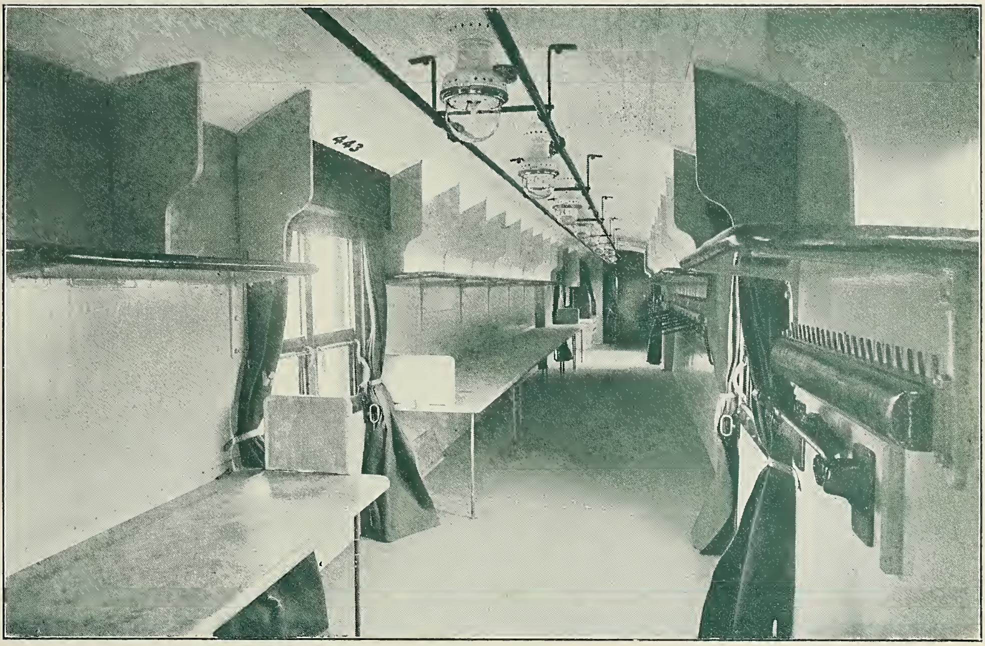
Lancaster, a distance of 241 miles. At the present day the special postal express covers the 540 miles between Euston and Aberdeen in five minutes over eleven hours.

The establishment of the London and Preston travelling Post Office was followed by others between Rugby and Newcastle-on-Tyne (in May, 1845), Gloucester and Tamworth, and Chester, and Holyhead, the latter commencing to run in March, 1852, while in 1860 arrangements were made for sorting the mails on the Holyhead and Kingstown packets.

Further extensions of the sorting-in-transit system have been made from time to time, and now almost every main line of railway in the Kingdom has a Night Mail Travelling Post Office running over its entire length, while many have one, or more, day mail services.

On the London and North-Western Railway there are eleven Night and nine Day Mail Travelling Post Offices, while the Caledonian Railway accounts for seven night and two day mail trips. Out of a total of seventy-three separate Travelling Post Offices in Great Britain the West Coast Railways are thus responsible for no fewer than twenty-nine, of which number eight perform the through journey between London and Aberdeen. The total distance run in the course of a year is approximately 1,800,000 miles.

On February 1st, 1859, a "limited mail" service was introduced, which had for its object a further acceleration of the mails by limiting the passenger and parcel traffic carried by certain trains. The first of these trains was employed for the Scotch Night Mail over the West Coast route, and comprised three sorting carriages and three vans or tenders for "through" bags, *i.e.* those not to be opened on the journey. This was a great step in advance. Prior to the change the mail left Euston at 8.45 p.m. and was due in Glasgow at 9.10 a.m., and Aberdeen at 2.18 p.m. The alteration fixed the hour of departure at 8.30 p.m. and the arrival at Glasgow and Aberdeen at 7.12 a.m., and 12.35 p.m., respectively.



INTERIOR OF BOGIE PARCELS POST SORTING VAN.

After a reign of twenty-six years the limited mail train was superseded by the now famous "special postal express," which admits none but postal officials between London and Stirling, and but few others between Stirling and Aberdeen.

For a considerable time there had been a desire to still further accelerate the night mails to the North and to Scotland. The advent of the Parcel Post in 1883 raised the question of parcel sorting in transit. For this purpose special carriages were constructed, and it soon became evident that the only satisfactory solution of the problem was to arrange for a train which should be entirely at the service of the Post Office.

During the negotiations which followed the Department was represented by Mr. F. E. Baines, Inspector General of Mails; the London and North-Western Railway by Sir George Findlay, and the Caledonian Railway Company by Mr. (afterwards Sir) James Thompson, while Mr. G. P. Neele and Mr. Irvine Kempt, the Superintendents of the respective railways, assisted in adjusting the working details.

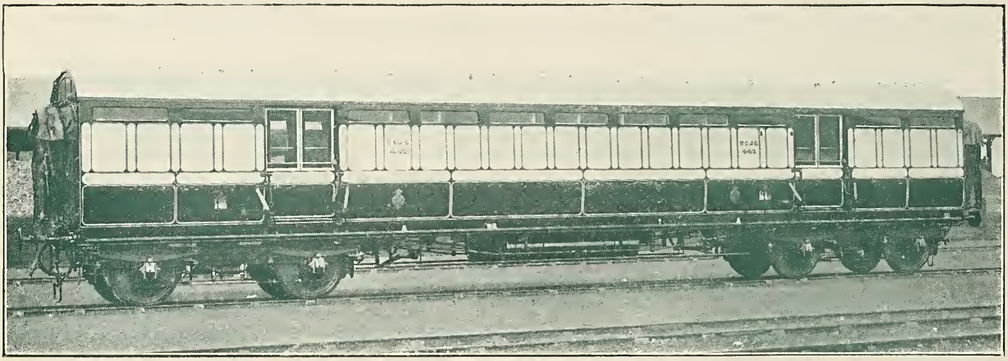
A thorough revision of the various connections throughout the entire route had first of all to be undertaken, involving not merely train connections, but the working hours of many postmen and sorters as well.

At last everything was arranged and the "special" left Euston for its maiden trip at 8.30 p.m. on July 1st, 1885. It was a memorable occasion, and the head officials of the Railways and the Post Office clustered on the platform to watch the departure of the first corridor mail train established in this country. It was due in Aberdeen at 9.10 a.m., but, while the hour of starting is still the same, the mail now reaches the northern terminus at 7.35 a.m.

No description of the West Coast Mail Service could be considered complete which failed to give some details of the running and working of this wonderful train, which occupies a place all its own in Railway and Postal Annals.

The "special" then is due to leave Euston at 8.30 p.m., but for an hour and a-half previously sorters are in possession and hard at work. The train is made up of about a dozen post office vehicles, marshalled according to a geographical plan. Next the engine is an Aberdeen brake van, containing the direct mail for places north of Carlisle, followed by a Scotch parcel sorting carriage and a van reserved for stowage purposes. Then come the Scotch Letter, and English Letter, and Parcel carriages, with another stowage carriage. A brake van carrying a guard, and two P.O. tenders with mails for Manchester and Liverpool bring up the rear.

The carriages are all brilliantly lit up, and are joined together by means of gangways, so that it is possible to walk from end to end of the train.



WEST COAST 57-FEET BOGIE PARCELS POST VAN.

The first exchange of mails by apparatus is at Harrow, and, during the run to Aberdeen, some sixty exchanges are made at full speed.

Rugby is the first stopping place, and here the mail is due at 10.8 p.m.; Tamworth is reached at 10.45 p.m. and Crewe at 11.49 p.m.

At this important junction the "special" connects with the following Travelling Post Offices, viz. Birmingham and Crewe; Bangor and Crewe; Manchester and Crewe; Cardiff and York; and the London and Holyhead Down Irish Mail.

Leaving at midnight, Wigan, Preston—where a second engine is coupled on—and Carnforth are left behind in turn, and, after the toilsome climb to Shap Summit, and a glorious rush down the other side, Carlisle is reached at 2.48 a.m.

Here the London sorters are relieved

by men working between Carlisle and Aberdeen, and the running of the train is taken over by the Caledonian Railway. Headed by one of Mr. J. F. McIntosh's powerful locomotives, the Border is speedily crossed. The first halt on Scottish soil is at Carstairs Junction at 4.18 a.m., where the Edinburgh and Glasgow portions are detached, and sent forward to their destinations.

At Stirling the bags for the Western Highlands are discharged, and a few early passengers for the North are accommodated in ordinary carriages attached to the rear of the mail vehicles.

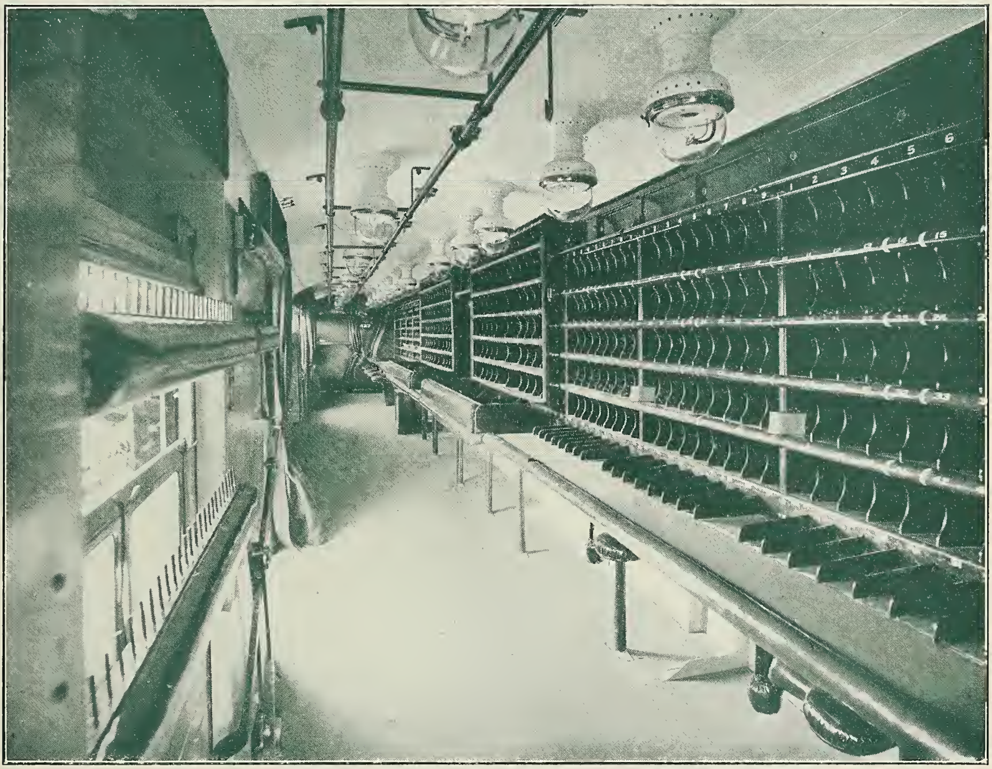
At Perth (5.53 a.m.) a connection is made with the Highland Railway's express for Inverness, attached to which are Letter and Parcel Sorting vans, and here also the mails for Dundee are unloaded, reaching "Juteopolis" by local train.

The remaining ninety miles are reeled off without a stop, and at 7.35 a.m. the "postal" glides alongside its platform at Aberdeen.

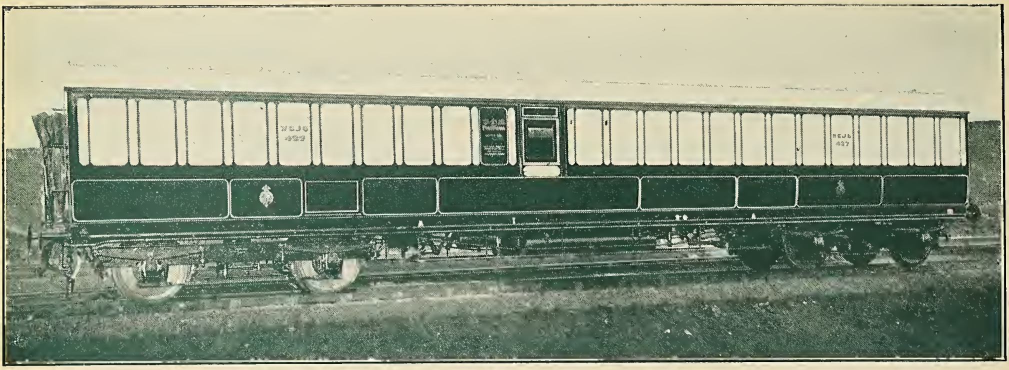
On the return journey the "special" leaves Aberdeen at 3.40 p.m., and, picking up its scattered units as it proceeds, is due at Euston at 4.16 a.m. the following morning. And, as a recent writer puts it, "no better work is done in van or on engine than between London and Aberdeen by the special postal trains."

It may be mentioned as an indication of the increase in this class of work that in the year 1843 the number of bags made up in the London and Preston Travelling Post Office Down Night mail was fifty-one, and in the Up mail forty-four, while to-day on the special trains, which are practically an extension of the former Travelling Post Office, 430 bags are accounted for on the Down, and 326 on the Up journey.

Thus far we have considered chiefly the system of Travelling Post Offices which represents probably the most obvious service rendered to the Post Office by the Railway Companies. It must not, however, be forgotten that the mail contracts also provide for the



INTERIOR OF BOGIE LETTER SORTING COACH.



WEST COAST 57-FEET BOGIE TRAVELLING POST OFFICE.

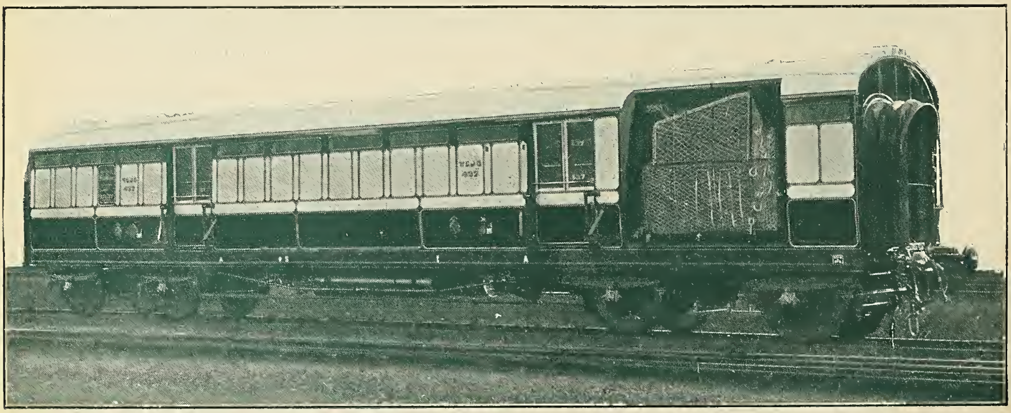
This picture shows the platform side of the vehicle, with letter box (beneath arrow in photo) for use at stations at which the train calls. The letter receiving and delivery apparatus are on the other side of the vehicle.

carriage of mails by any train, whether passenger or goods, and there are few passenger trains running which do not render this service between, at least, certain points on their journey.

When no postal official travels with the train the mails are under the charge of the guard. For the Letter Mail Services the average cost to the Post Office works out at from 2s. to 2s. 6d. per train mile. By Act of Parliament passed August 18th, 1882, the Railway Clearing House receives eleven-twentieths of the postage collected upon all postal parcels carried by railway.

A good many years ago, Messrs. W. H. Smith and Son, the eminent newsagents, arranged with the London and North-Western Railway for the use of a train specially arranged for the conveyance and assortment of newspapers. It was due to leave Euston at 5.15 a.m. every week day and ran swiftly to Stafford. This was the first of the so-called "newspaper trains" with which we are now familiar, and the Post Office has not been slow to take advantage of them for the conveyance of letters posted after the despatch of the previous night mails, thus ensuring a proportionately earlier delivery.

We have now completed a rapid survey of the important part played by the West Coast Railways in building up, and consolidating, the British Postal System. On this route practically the whole of the experimental work has been done since the earliest days of the railway, and the result is seen in a service, of which we are all justly proud, which also has become one of the indispensable assets of our modern complex civilisation.



WEST COAST 57-FEET BOGIE TRAVELLING POST OFFICE.

April 1903

The Conveyance of Large Castings by Railway.

By Arthur H. Tatlow (*Glasgow and South-Western Railway*).

IT will doubtless be known to many readers of the Railway Magazine that railway companies, as common carriers, come under certain legally-defined obligations. They are bound by law to receive from all persons and carry all such goods as they are empowered, profess, and have convenience to carry, or are in the habit of taking, tendered to them for conveyance, and for which charges are offered; and, in a general sense, treating all persons alike upon the same terms as regards rates, other charges and facilities; and they are liable to penalties for refusing to receive for carriage such goods as they are accustomed to carry without special reasons for so refusing.

But their duty to receive traffic brought for carriage may be regulated by their own will in many respects. They may choose by public profession and announcement the kind of conveyance, the times for transit, the mode of delivery, and the articles to be carried; and the duty to convey goods and articles is always, of course, limited by the practability to carry.

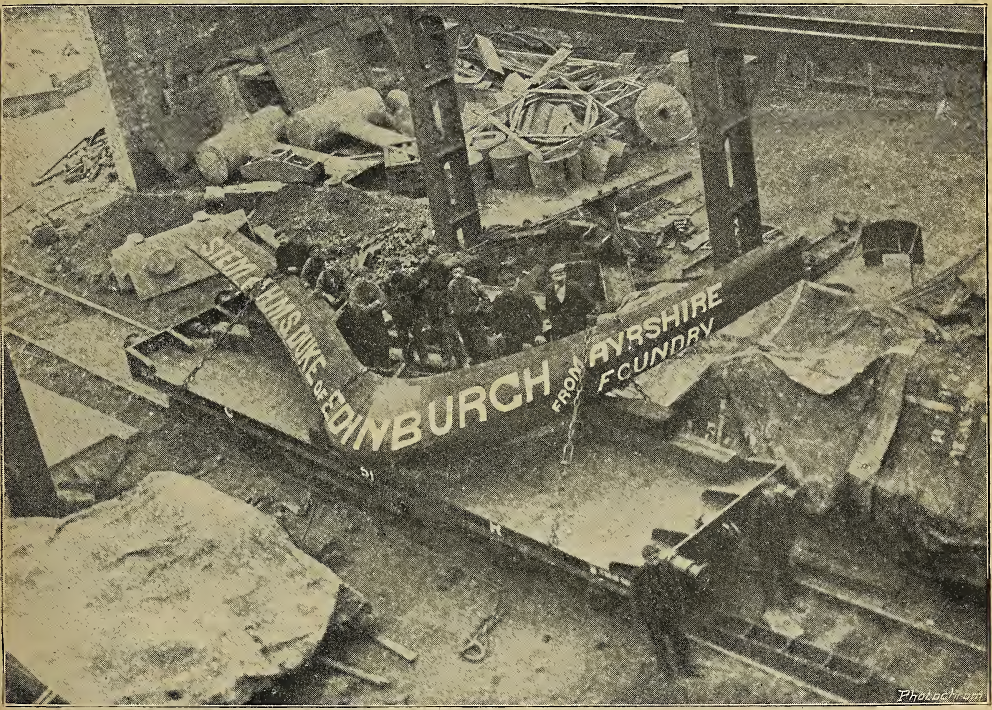


Photo., S. Evans, Jun.] 20-TON CASTING LOADED ON A 30-TON TROLLEY WAGON, CALEDONIAN RAILWAY. [*Stevenston.*
Photo taken from above.

For instance, a railway is not bound to receive for conveyance goods which they do not profess to the public to carry. A carrier may advertise to carry light goods only, and then he cannot be compelled to carry heavy goods.

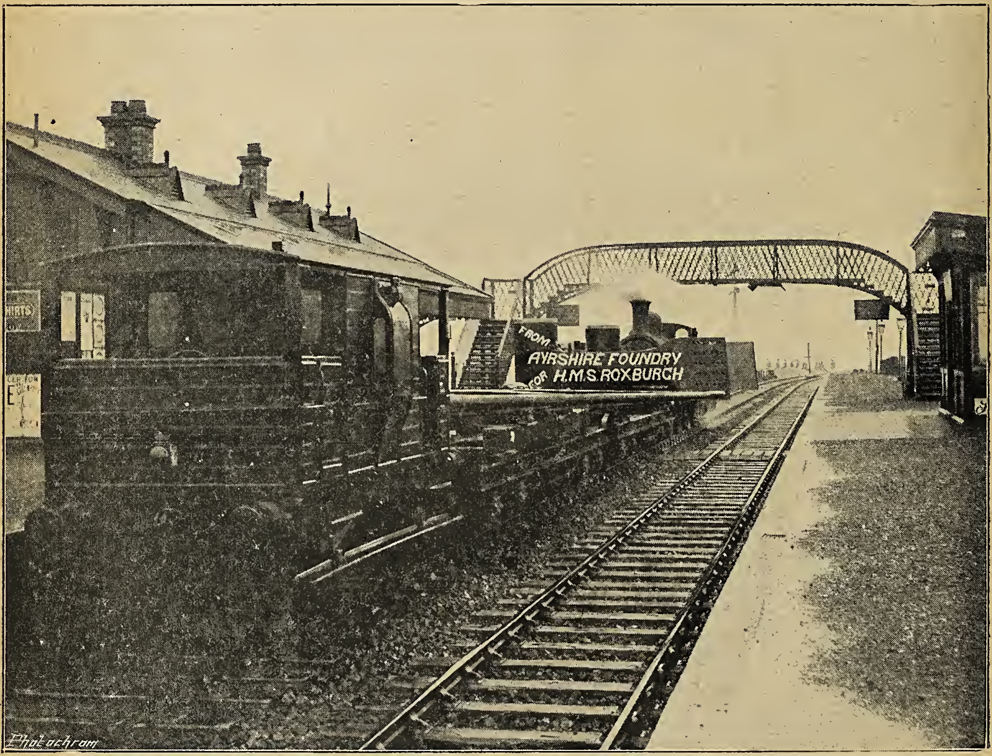
The Railway and Canal Traffic Act provides that a railway company must "afford all reasonable facilities for the receiving, forwarding, and delivering of traffic," and further, that "no company shall make or give any undue or unreasonable preference or advantage to or in favour of any particular person or company, or any particular description of traffic in any respect whatsoever."

The obligations enjoined by the Railway and Canal Traffic Act are certainly very onerous, and, as generally happens in such cases, the language employed is not always explicit.

The clause as to "affording reasonable facilities" is an example; a clause in itself wide enough to give authority to interfere even with the construction of the railway, or to direct the providing of new or improved structural accommodations, or the building of wagons of abnormal construction and capacity.

But, apart from legal obligations, railway companies find themselves from time to time bound by obligations—while not influenced by the pressure of the law—of a reciprocal and commercial nature which it would be neither policy nor perspicuity to ignore.

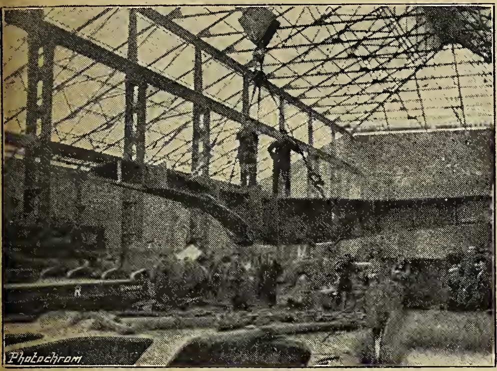
There are certain traffics which, owing either to their peculiar nature, size, or shape, the railway companies might sometimes dispense with without much loss of revenue; traffics which are carried to suit the convenience of the particular trades in which they are used,



A SPECIAL TRAIN OF LARGE CASTINGS LEAVING STEVENSTON STATION, CALEDONIAN RAILWAY.

rather than as a profit-earning traffic for the carrier.

If carriers were at perfect liberty to place freight charges on such traffic at figures which they might consider as ample remuneration for the extra trouble, expense, and special services which its conveyance may entail, then the case might bear a different complexion, but in some cases, on grounds of expediency, the railway companies cannot always so recoup themselves.



LOADING A GIGANTIC PIECE OF IRONWORK ON A RAILWAY TRUCK.

Transport companies—whether by land or sea—recognise that in the matter of rates and fares there is a figure above which it is inimical to their interests to charge, and that it would be suicidal to levy freight that the traffic could not bear; and that even in some cases it is politic—for domestic and other reasons—to give special facilities for abnormal consignments if such be necessary, at rates, to say the least, not exactly remunerative.

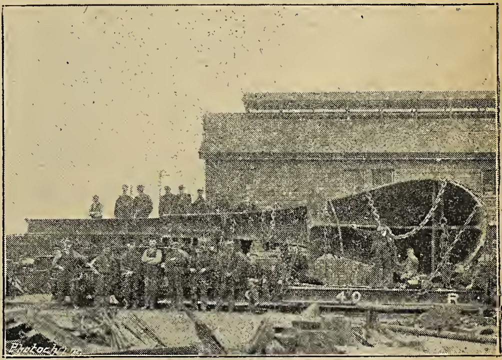
It may be said that the material which forms the subject of this article is a traffic of this description.

The three leading Scotch railway companies, viz., the Caledonian, North British, and Glasgow and South-Western, have a traffic in large castings, but the chief share falls to the Caledonian Railway, which has consignments weekly, and it deals with a class of casting traffic which seldom finds its way into the hands of the other two railways, or if it does, not in the same tonnage weight per consignment or so frequently.

The class of traffic specially referred to in this article is a Sunday traffic, for it is only possible to arrange for the conveyance of the castings shown on the photographs when both lines of rails are available.

The Caledonian Railway have siding connection with two important firms who manufacture these descriptions of castings, which are largely used in the equipment of His Majesty's warships. At Stevenston, in Ayrshire, a town served both by the Caledonian and Glasgow and South-Western Railway Companies, the Ayrshire Foundry has its works, at which are made most of the heavy castings herein referred to; while at Newton, near Glasgow, on the Caledonian line, the Steel Company of Scotland turn out weekly consignments of castings of a similar character.

Both these firms manufacture stern frames, stern posts, propeller brackets, ships' rudders, etc., many of which are sent to Admiralty ports. These different castings vary in size and weight, according to the class of vessel for which they are intended, but they range anywhere between ten and twenty tons, sometimes, indeed, exceeding twenty tons. But it is not the weight only, or even the bulk of these large castings

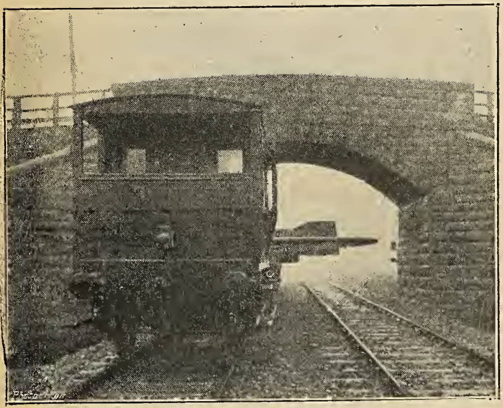


STERN-POST OF MAN-OF-WAR LOADED ON CALEDONIAN RAILWAY TRUCK.

which cause the carriers trouble and anxiety, but the *shape* of them.

Much heavier and much longer articles may be negotiated with comparative ease. Girders, for instance, are carried regularly by most railway companies with little inconvenience and under normal conditions. At the present time the Caledonian Railway is carrying 50-ton girders, 106ft. long, in connection with the enlarging of its Central Station, Glasgow, without experiencing any difficulty. The lengths are simply loaded on bolster wagons and chained, sufficient room being allowed for the safe play of the girders when taking curves.

With the class of traffic under notice, however, it is a different matter. In addition to the fact that this traffic can only be carried on Sunday, it must also be remembered that it can only be hauled *short* distances owing to it having, in many cases, to be conveyed on the *wrong line.* The care with which curves have to be taken, bridges and stations passed, as well as frequent stoppages for examination of load, oiling, etc., debars the train travelling at a higher rate than from 5 to 10 miles an hour. Hence it is that although a large percentage of these heavy castings are destined for the Government Dockyards at Pembroke, Chatham, Devonport, or Portsmouth, etc., they are only sent to General Terminus, Glasgow, by rail, from whence they are shipped, as it would be impracticable to send them by rail direct, the English railway companies having to deal with a Sunday train service (which the Scotch lines have not), and they are therefore unable to undertake their conveyance south of Carlisle. Some of the illustrations of this article represent portions of a consignment making up a special train which left Stevenston, Caledonian Railway, on Sunday, February 8th last, for General Terminus, Glasgow. The traffic consisted of three large castings and two propeller brackets, which were loaded on a 30-ton boiler wagon, and a ship's rudder, loaded on the same class of vehicle, both of which, being under the platform level, necessitated the load being raised on the truck by beams of wood placed beneath, in order to carry the castings safely over any obstacles from 3ft. 6in. to the ground. The brackets measured at their widest part about 11ft., and each weighed 11 tons 10 cwts. The rudder measured 22ft. by 22ft., and weighed 12 tons 2 cwts. These castings formed a fairly easy load for the class of wagon used.


A CALEDONIAN RAILWAY SPECIAL TRAIN, THE LOAD OF WHICH PROJECTS OVER THE 6-FT. WAY AND THE ADJOINING 4-FT. WAY.

It may be easily conceived that to make sure that such traffic is safely and securely loaded, the greatest possible care has to be exercised, the slightest mistake being fraught with very serious consequences.

When the makers have a consignment ready for despatch they advise the railway company's agent, who goes to the works, inspects the castings, and determines the class of trucks necessary for their proper conveyance. The vehicles having been obtained, the castings—by means of a large travelling crane—are placed thereon and passed over the weigh-bridge in the presence of representatives of the makers, the Government, and the railway, for from the weight thus obtained accounts are drawn up and the railway company's tonnage charge made.

The railway company's agent personally superintends the loading, making careful measurements and calculations, so that the load is so fixed as to be clear of all obstacles such as station platforms, bridges, walls, and making due allowance for any curves en route.

The photo on page 284 shows the train at a bridge, and gives a fair view of the overhanging load, stretching, as it does, beyond the extreme rail of the opposite line.

The illustration on page 282 shows the complete train leaving Stevenston for Glasgow with the castings similar to those already described.

The photograph on page 281 shows a 20-ton stem casting, loaded on a Caledonian 30-ton trolley-wagon, ready for despatch. The writer would have liked to obtain a photograph of this large casting on the line, as it would have presented a good picture of an overhanging load, but this was impossible. A very fair estimate, however, may be formed of the projection beyond the gauge, even from the view of the truck in the foundry.

The running of these Sunday specials involves, of course, considerable expense, for which the carriers have to recoup themselves by what is known as a "special train charge" over and above the ordinary tonnage rate. This special charge will vary according to the distance run or the special facilities required. The extra train charge from Stevenston to General Terminus, a distance of 27 miles, is something like £12 10s.; this, with a rate of 5s. 5d. per ton for castings under 20 tons in weight, makes up the particulars for charging purposes. Working out the receipts for a given load, the figures might at first sight give a favourable impression, but in estimating the cost of running these Sunday specials several factors have to be taken into account. In the first place, several men have to be brought out along the line, such as signalmen and inspectors, to pass the train, over and above the station staff, the engine-driver, fireman, and brakesman.

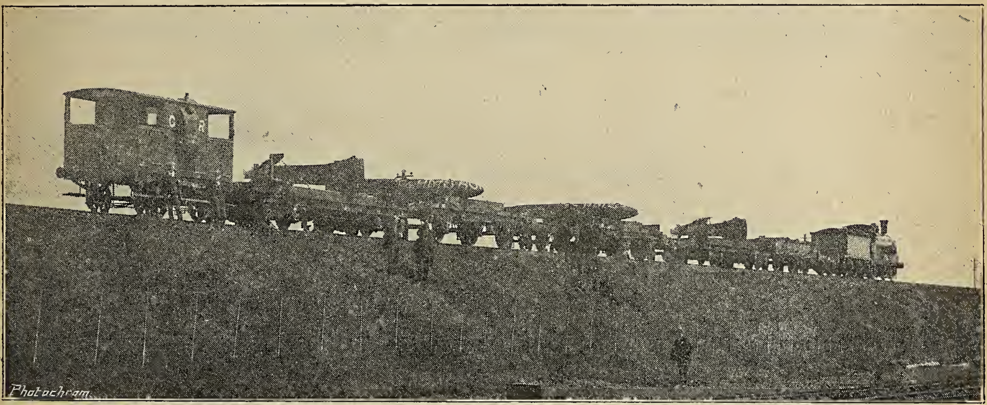


Photo., Logan.] SPECIAL TRAIN OF STERN FRAMES, ETC., FROM STEVENSTON TO GENERAL TERMINUS, GLASGOW—THE LOAD PROJECTING OVER THE ADJOINING LINE. [*Stevenston.*

Then, again, the class of wagons necessary for the conveyance of such traffic necessitates considerable capital outlay, whilst the wagons being only occasionally employed, are features not to be ignored in such calculations. The double mileage run by the engine and trucks has also to be borne in mind.

It may be added that in dealing with these large casting specials and the peculiar transit difficulties which they present, it is the aim of all concerned to perfect the details in every part, and when this is once attained subsequent consignments are handled in identically the same manner.

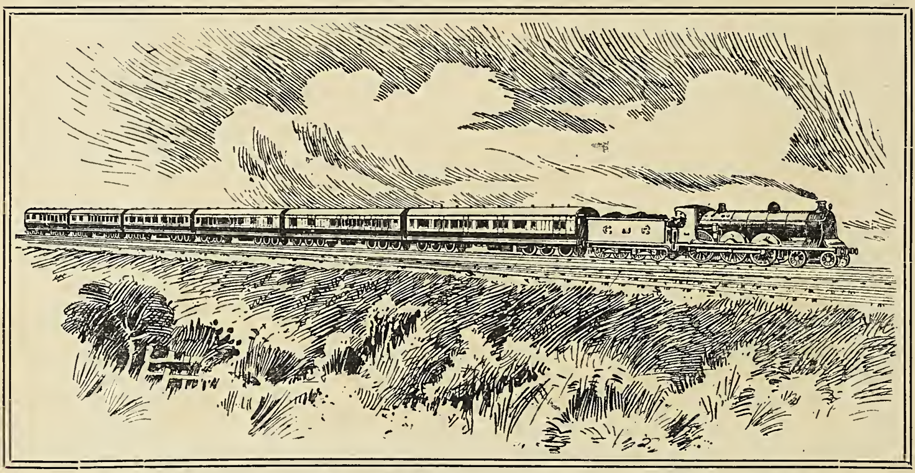
It says much for the Caledonian officials at headquarters, and particularly, perhaps, for the station agent at Stevenston, that so few hitches take place, and that generally these awkward consignments are conveyed so promptly and safely, and to the entire satisfaction of the makers.

I am indebted to Mr. R. Millar, General Manager Caledonian Railway, and to Mr. W. Cook, Outdoor Goods Manager, for some photographs of these castings on rail; also to Mr. Alexander, the Caledonian Company's Agent at Stevenston, for much useful information as to the loading, and for his kind attention in showing me over the works at Stevenston. I also gratefully recognise the kindly services of Mr. James Brown, of Greenock, who took some photographs of the castings in the Ayrshire Foundry, all for the purposes of this article.

* * *

CALEDONIAN RAILWAY.

THE "GRAMPIAN CORRIDOR."



The Finest Train in Scotland now running from

GLASGOW (BUCHANAN STREET), at 10 a.m.,

AND

EDINBURGH (PRINCES STREET), at 9.25 a.m.

TO ABERDEEN.

Returning from Aberdeen to Glasgow and Edinburgh at 5.25 p.m.

R. MILLAR, General Manager.

TICKET NIPPERS

CALEDONIAN.

No.	Station
218	Lockerbie.
219	Dumfries.
220	Carstairs.
221	Merchiston.
222	Carlisle.
223	Larbert.
224	Beattock.
225	Dundee, West.
226	Stirling.
228	Glenbuck.
230	Arbroath.
231	Dunblane.
232	*Reserved.*
233	Holytown.
234	*Reserved.*
235	Bridge of Allan.
236	Haymarket West Jct.
237	Kirtlebridge.
238	Gourock.
239	Hamilton Central.
240 to 243	*Reserved.*
244	Careston.
263	Perth.

No.	Station	
265	Aberdeen (*for Cal. trains only*).	
265 ◣	Aberdeen (*for North British trains only*).	*Number impressed, sign punched out*
266	Forfar.	
267	Kinfauns.	
268	Stanley.	
A	Airdrie. Alyth. Ardrossan.	*Letters or signs punched out. No triangular nip.*
B	Blairgowrie. Coatbridge.	
C	Wilsontown.	
✢	Glasgow Cross.	
F	Ferniegair.	
G	St. Rollox.	
H	Hamilton West.	
J	St. James'.	
L	Edinburgh. Lochmaben. Sandilands.	
M	Motherwell	

Letter	Station	
N	Greenock, West. Grangemouth. Innerpeffray. Uddingston.	*Letters or signs punched out. No triangular nip.*
P	Paisley.	
T	Stonehouse	
U	Glasgow (*Buchanan Street*).	
W	Port Glasgow.	
●–●	Irvine.	
B	Blackwood.	*Letters impressed. With triangular nip.*
L	Lesmahagow	
F	Larkhall.	
M	Montrose.	*Letter punched out. With triangular nip.*
M	Fort Matilda. Murrayfield.	*Letter punched out of edge of ticket.*

CALEDONIAN—*continued.*

No.	Used at	
Y	Corridor Train, Glasgow and Euston.	
C 1 to C 12	Glasgow (*Central*)	*Nippers punch out the letter and impress the numbers.*
$\frac{1}{05}$ & $\frac{2}{05}$	Clydebank	*Numbers impressed. No triangular nip.*
$\frac{3}{05}$ & $\frac{4}{05}$	Lyne	
$\frac{5}{05}$ to $\frac{9}{05}$	Partick West	
$\overset{1}{⬆}$ to $\overset{9}{⬆}$	Glasgow (*Central*) (*Low Level*)	*Number impressed, sign punched out.*
Ⓟ1 to Ⓟ13	Paisley. Gilmour St	*These are impressed. The tickets are not otherwise marked or cut.*
P 1 to P12	Pollokshields.	
T	Dubton Junc.	
X 1 to X 16	Inspectors' Staff.	
B	Bridge of Dun.	
E 1 to E 26	Glasgow (*Eglinton St.*)	

No.	Used at	
①	Connel Ferry.	*The circle is impressed, but the numbers are punched out.*
②	Achnacloich.	
③	Taynuilt.	
④	Loch Awe.	
⑤	Dalmally.	
⑥	Tyndrum.	
⑦	Crianlarich.	
⑩	Luib.	
⑪	Killin Junction.	
⑫	Killin.	
⑬	Loch Tay.	
⑭	Lochearnhead.	
⊕	Callander.	

No.	Used at	
O 1	Maryhill.	*Numbers impressed. No triangular nip.*
O 2	Kirklea.	
O 3	Botanic Gardens	
O 4	Kelvinbridge.	
O 6	Stobcross.	
O 7	AndinstonCross.	
O 8	Glasgow Green.	
O 9	Whifflet.	
O 10	Dalmarnock.	
O 11	Kilbirnie.	
▲	Oban.	*Signs are punched out. The tickets are not otherwise marked or cut.*
◓	Strathyre.	
● ●	Calder.	
⁖	Calderbank.	
♣	Annan.	
♠	Lanark.	
♥	Midcalder.	
⛉	Bridgeton Cross.	
∴	East Kilbride.	
◢	Comrie.	
♣	Crieff.	
◡	Dawsholm.	

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Sign or Letter	In use at
	CALEDONIAN
♣	East Kilbride
◭	Comrie
⊥	Crieff
▙	Cove.
▟	Alyth Junction
▚	Yoker.
★	Highlandman.
▼	Douglas West.

S
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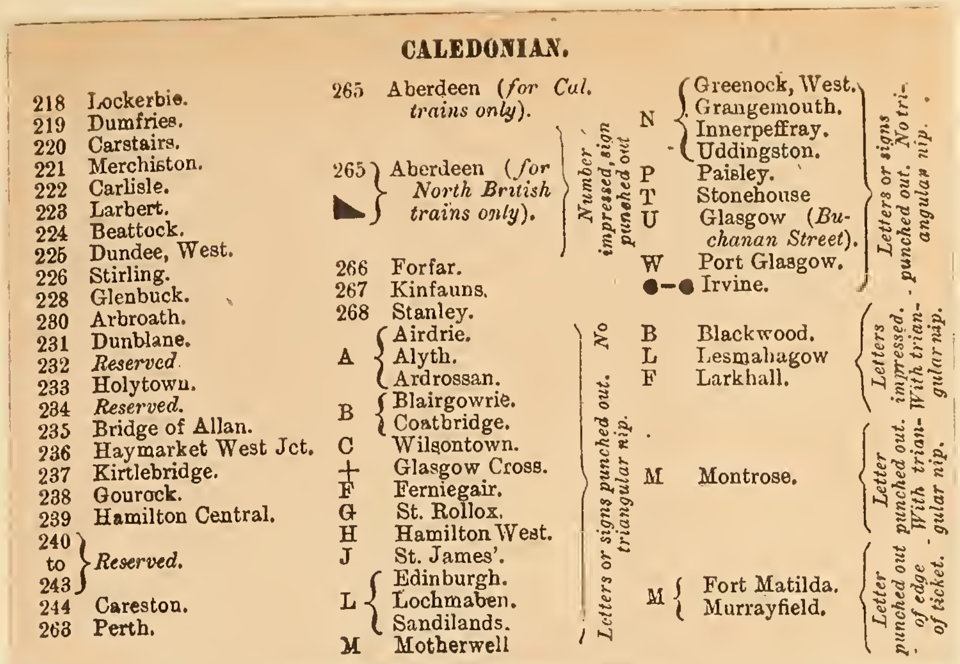
TICKET NIPPERS

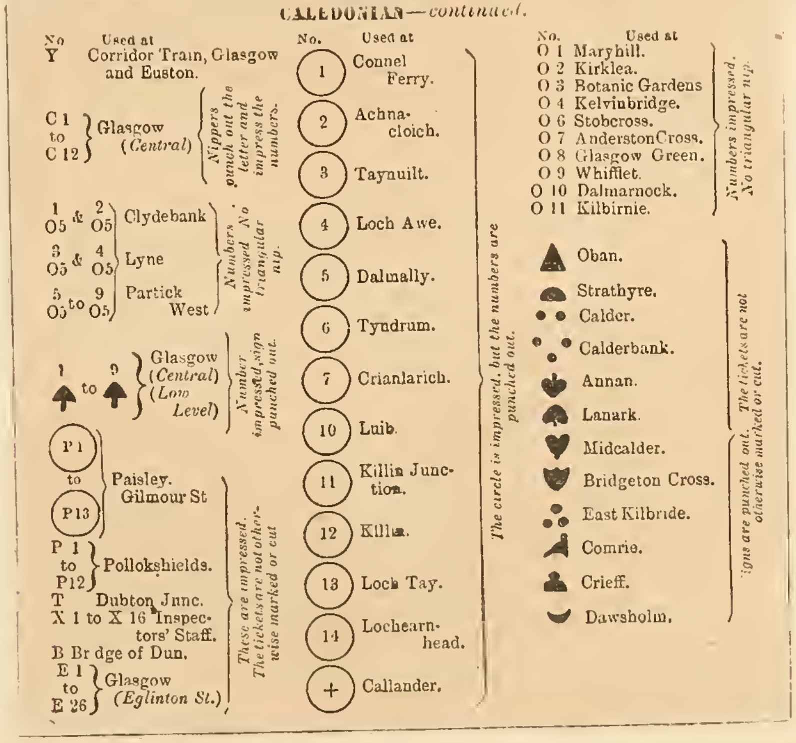


CALEDONIAN.

218	Lockerbie.
219	Dumfries.
220	Carstairs.
221	Merchiston.
222	Carlisle.
223	Larbert.
224	Beattock.
225	Dundee, West.
226	Stirling.
228	Glenbuck.
230	Arbroath.
231	Dunblane.
232	*Reserved*
233	Holytown.
234	*Reserved.*
235	Bridge of Allan.
236	Haymarket West Jct.
237	Kirtlebridge.
238	Gourock.
239	Hamilton Central.
240 to 243	*Reserved.*
244	Careston.
263	Perth.

265	Aberdeen (*for Cal. trains only*).	
265 ◣	Aberdeen (*for North British trains only*).	*Number impressed, sign punched out*
266	Forfar.	
267	Kinfauns.	
268	Stanley.	
A	Airdrie. Alyth. Ardrossan.	*Letters or signs punched out. No triangular nip.*
B	Blairgowrie. Coatbridge.	
C	Wilsontown.	
+	Glasgow Cross.	
F	Ferniegair.	
G	St. Rollox.	
H	Hamilton West.	
J	St. James'.	
L	Edinburgh. Lochmaben. Sandilands.	
M	Motherwell	

N	Greenock, West. Grangemouth. Innerpeffray. Uddingston.	*Letters or signs punched out. No triangular nip.*
P	Paisley.	
T	Stonehouse	
U	Glasgow (*Buchanan Street*).	
W	Port Glasgow.	
●–●	Irvine.	
B	Blackwood.	*Letters impressed. With triangular nip.*
L	Lesmahagow	
F	Larkhall.	
M	Montrose.	*Letter punched out. With triangular nip.*
M	Fort Matilda. Murrayfield.	*Letter punched out of edge of ticket.*

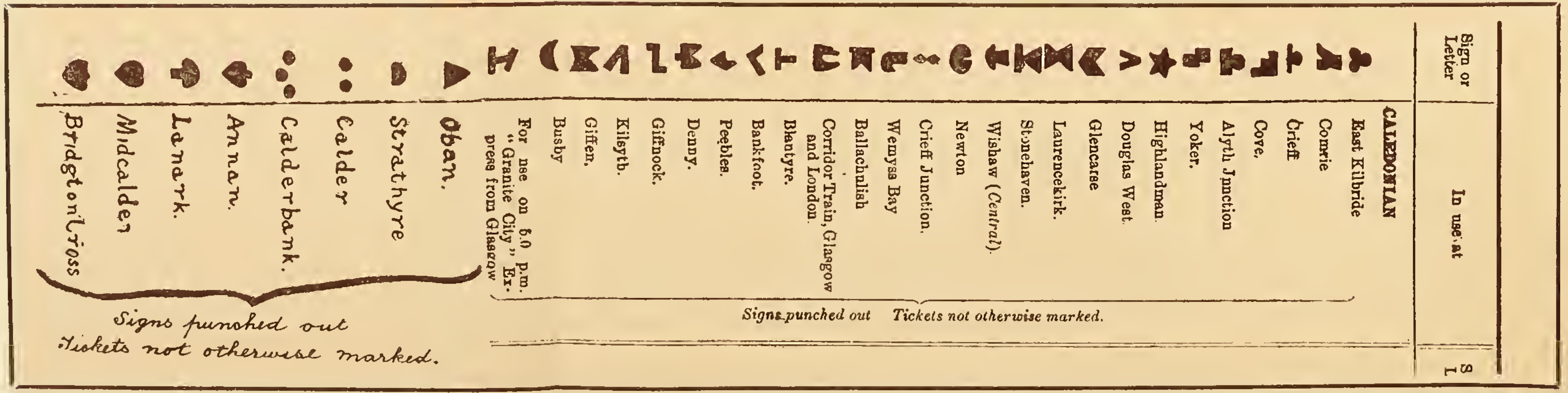


CALEDONIAN—*continued.*

No	Used at	
Y	Corridor Train, Glasgow and Euston.	
C 1 to C 12	Glasgow (*Central*)	*Nippers punch out the letter and impress the numbers.*
1/O5 & 2/O5	Clydebank	*Numbers impressed. No triangular nip.*
3/O5 & 4/O5	Lyne	
5/O5 to 9/O5	Partick West	
1 ⬆ to 9 ⬆	Glasgow (*Central*) (*Low Level*)	*Number impressed, sign punched out.*
(P1) to (P13)	Paisley. Gilmour St	
P 1 to P12	Pollokshields.	*These are impressed. The tickets are not otherwise marked or cut*
T	Dubton Junc.	
X 1 to X 16	Inspectors' Staff.	
B	Bridge of Dun.	
E 1 to E 26	Glasgow (*Eglinton St.*)	

No.	Used at	
(1)	Connel Ferry.	*The circle is impressed, but the numbers are punched out.*
(2)	Achnacloich.	
(3)	Taynuilt.	
(4)	Loch Awe.	
(5)	Dalmally.	
(6)	Tyndrum.	
(7)	Crianlarich.	
(10)	Luib.	
(11)	Killin Junction.	
(12)	Killin.	
(13)	Loch Tay.	
(14)	Lochearnhead.	
(+)	Callander.	

No.	Used at	
O 1	Maryhill.	*Numbers impressed. No triangular nip.*
O 2	Kirklea.	
O 3	Botanic Gardens	
O 4	Kelvinbridge.	
O 6	Stobcross.	
O 7	AndersonCross.	
O 8	Glasgow Green.	
O 9	Whifflet.	
O 10	Dalmarnock.	
O 11	Kilbirnie.	
▲	Oban.	*igns are punched out. The tickets are not otherwise marked or cut.*
◓	Strathyre.	
● ●	Calder.	
∵	Calderbank.	
♣	Annan.	
♠	Lanark.	
♥	Midcalder.	
	Bridgeton Cross.	
∴	East Kilbride.	
	Comrie.	
	Crieff.	
◡	Dawsholm.	



Sign or Letter	In use at
	CALEDONIAN
	East Kilbride
	Comrie
	Crieff
	Cove.
	Alyth Junction
	Yoker.
	Highlandman.
	Douglas West.
	Glencarse
	Laurencekirk.
	Stonehaven.
	Wishaw (*Central*).
	Newton
	Crieff Junction.
	Wemyss Bay
	Ballachulish
	Corridor Train, Glasgow and London.
	Blantyre.
	Bankfoot.
	Peebles.
	Denny.
	Giffnock.
	Kilsyth.
	Giffen.
	Busby
	For use on 6.0 p.m. "Granite City" Express from Glasgow
	Oban.
	Strathyre
	Calder
	Calderbank.
	Annan.
	Lanark.
	Midcalder
	BridgtonCross

Signs punched out Tickets not otherwise marked.

Signs punched out
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The Gradients of our Chief Railways.

No. IX.—Caledonian Railway.—*Continued.*

By W. J. Scott, B.A.

(3) Carstairs (Strawfrank Junction Box) to Edinburgh.

THIS short section of main line—for the Edinburgh service can hardly be deemed a branch—has a fairly stiff bank at the outset for down trains, and is a decidedly hard one for three-fourths of the way for up ones.

From Strawfrank Box (or from Carstairs Station) to Cobbinshaw is a continuous rise for over nine or ten miles, broken only by two short bits of slight downhill some 2 and 4 miles from the start. The first 2 miles are up hill at 200, 220, and 100, for just beyond Carnworth. After that station comes a half-mile at nominal downhill grades (900, etc.), a like distance rising at 300 or level, and then another downward bit, for about ¾ mile, at 450. Thence the bank continues past Ampherlaw at 233 for about 2 miles, steepening to 132 before Auchengray to Wilsontown Junction (South Box), 1½ mile; then easing again to 176 for a like distance, but ending with 1¼ mile at 100 to the summit, about 600 yards before Cobbinshaw Station. The summit stands 870ft. above 'datum,' and 250ft. above Strawfrank, so that the average grade for the bank is about 1 in 190.

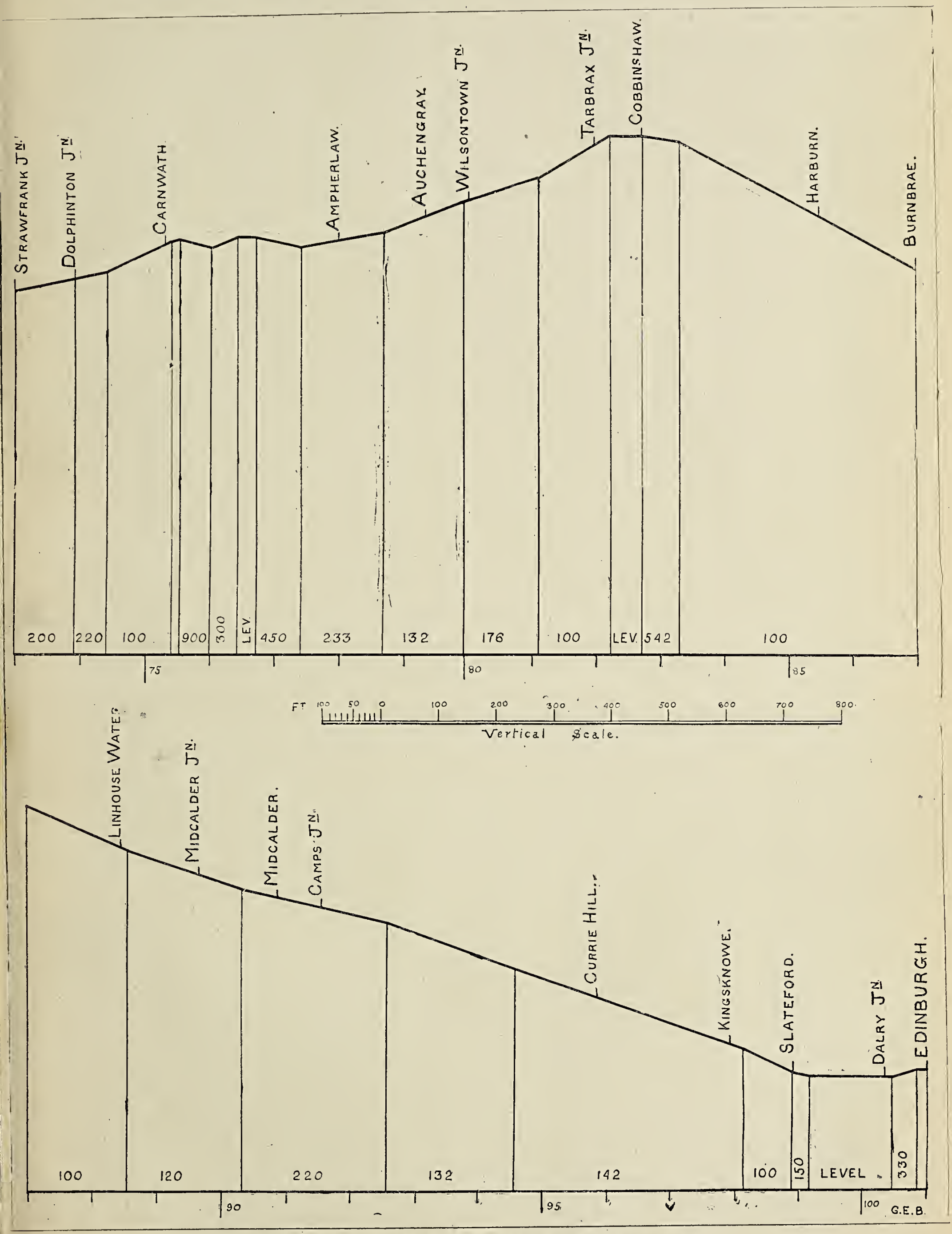
At the summit there is a mile nearly level, and then comes a continuous 16-mile fall — the Midcalder bank — to Edinburgh. The first half-mile (by the 83rd mile-post from Carlisle) is only at 542, but after that are 5 miles at 100, to Finhouse Water box, with 2 miles at 120, and three more (on either side of Midcalder Station) at 220. At the 92½ mile-post the fall steepens again to 132 for 2 miles, continuing at 142 for three more, past Currie Hill to Kingsknowe with a last mile at 100-150 to Slateford, the first station within the Edinburgh radius. Then comes over a mile dead level, with a momentary rise at 330 just before reaching Princes' Street terminus. This is a very favourable stretch for down trains, as except at Midcalder there are but few curves or other reasons for slackening speed. For up trains, however, it is a heavy 16 miles to face so soon after starting; the total rise from Slateford to Cobbinshaw is 660ft., and the average gradient a rising one at 1 in 128. The loads, it is true, are seldom very heavy, but neither are they often light, while the booked speeds are certainly high by some trains.

(4) Edinburgh and Glasgow.

This important section, which may be called a *local* main line, is a great contrast to its older rival of the North British Railway, for, whereas the original "Edinburgh and Glasgow Railway" is practically dead level to Cowlairs, the Caledonian route is a hard one throughout (except the last 8 miles into Glasgow), with one bank of 14 miles, with bits in it at 1 in 80 and 1 in 70. The summit is at Benhar Junction, almost exactly midway between the two termini; the line is harder going East than the other way, partly because "Central" (Glasgow) lies slightly lower than Prince's Street, and also because the 8½ nearly level miles from Glasgow make the final climb to Benhar much steeper.

Starting from Edinburgh, the first 11½ miles—to Midcalder Junction box—are on the main Carstairs-Edinburgh line just described. Thus, after two almost level miles, there is an 11-miles bank from Slateford at 102 for less than a mile, then at 143 for 3½ miles, and

134 for over two more, easing to 220 for a like distance, ending with a half mile at 120, to Milcalder Junction, which is the actual top of the bank.



GRADIENT PROFILE, CARSTAIRS TO EDINBURGH.

The next 2 miles are at first downhill at 132, and then level; at the 33¾ mile-post from Glasgow another climb begins—sometimes called the Fauldhouse bank—extending for nearly 10 miles to Benhar, though broken by two level stretches each over a mile in length.

The bank begins at 124 for 1 mile, followed by about 1½ mile of level to West Calder; thence to beyond Addiewell is again uphill at 105 for fully 1½ mile, easing to 220 to Woodmuir Junction, but steepening to 138 for over a mile to Breich. Another mile of dead level comes there, after which the rise is continuous at 100 (or 99) to Fauldhouse and Benhar Junction, exactly 2 miles. The average grade for this bank is about 1 in 177.

Benhar Junction box stands just 800ft. above Ordnance Datum, and the fall thence to Uddingston is over 700ft.; a formidable climb of nearly 15 miles for 'East-bound' trains.

After a tiny strip of level at the summit, the line falls at 99 for 2 miles, with a short bit at 117 to Shotts, continuing thence at 1 in 100 for 1½ mile to Hartwood, and then at 137, followed by level (each for barely a mile). Then the fall continues at 100 to Omoa, and at 96 to 80 to Newarthill (goods), about 3½ miles in all. Another downhill mile at 107 brings us to Holytown, where the Carlisle-Glasgow main line is joined. For the next 2½ miles the gradient changes often, but is largely falling at 93 to 86; from Mossend to Bellshill is a mile all but level, with the final fall to Uddingston; the first 2¾ miles are at 1 in 70, with varying grades (143 to all but level) at the end. The 8 miles from Uddingston into Glasgow have a bit of rise at 180, and over a mile of fall (Cambuslang to Rutherglen) at 163, the last four are practically level.

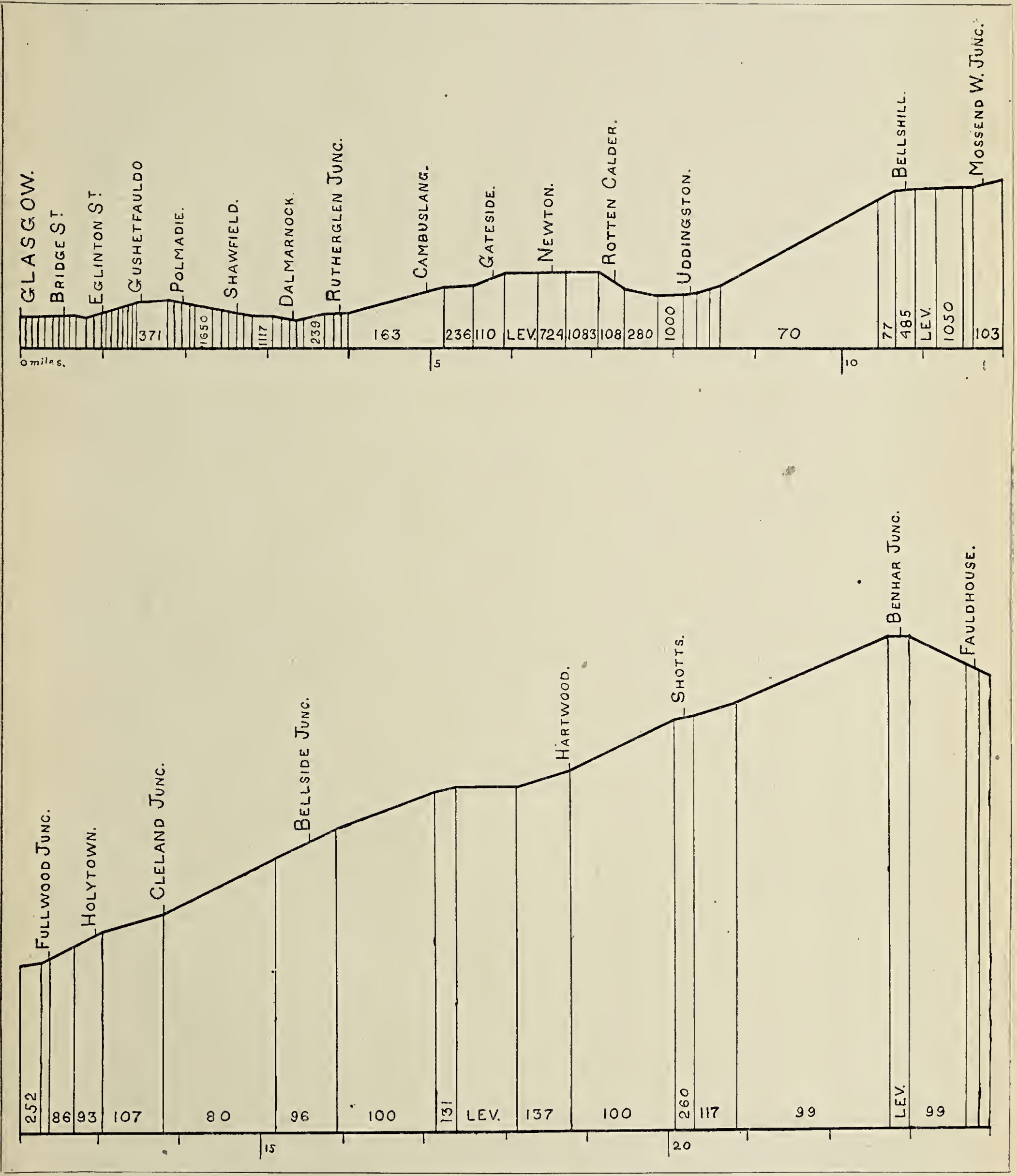
There is a great general likeness between this section and that of the Great Central between Sheffield and Manchester; it deserves the epithet, "like the roof of a house," even more than the latter, since it has the peak of the gable exactly in the middle. The 44 miles between Eglinton Street (Glasgow) and Merchiston (Edinburgh) are covered in 57 minutes by some trains both ways, an inclusive speed of about 46½ an hour; with the many facing-point junctions, curves, and other obstacles (particularly on the Western half of the route) this must be reckoned as remarkably good work on so difficult a course; the loads, as a rule, are moderate.

(5) The Gourock and Wemyss Bay Branches.

Though a branch line, there are true expresses running on this section, and the Wemyss Bay portion has such steep bits at both ends that it seems worth while to give the full profile, the more so that in summer the 'boat' trains are often very heavy ones.

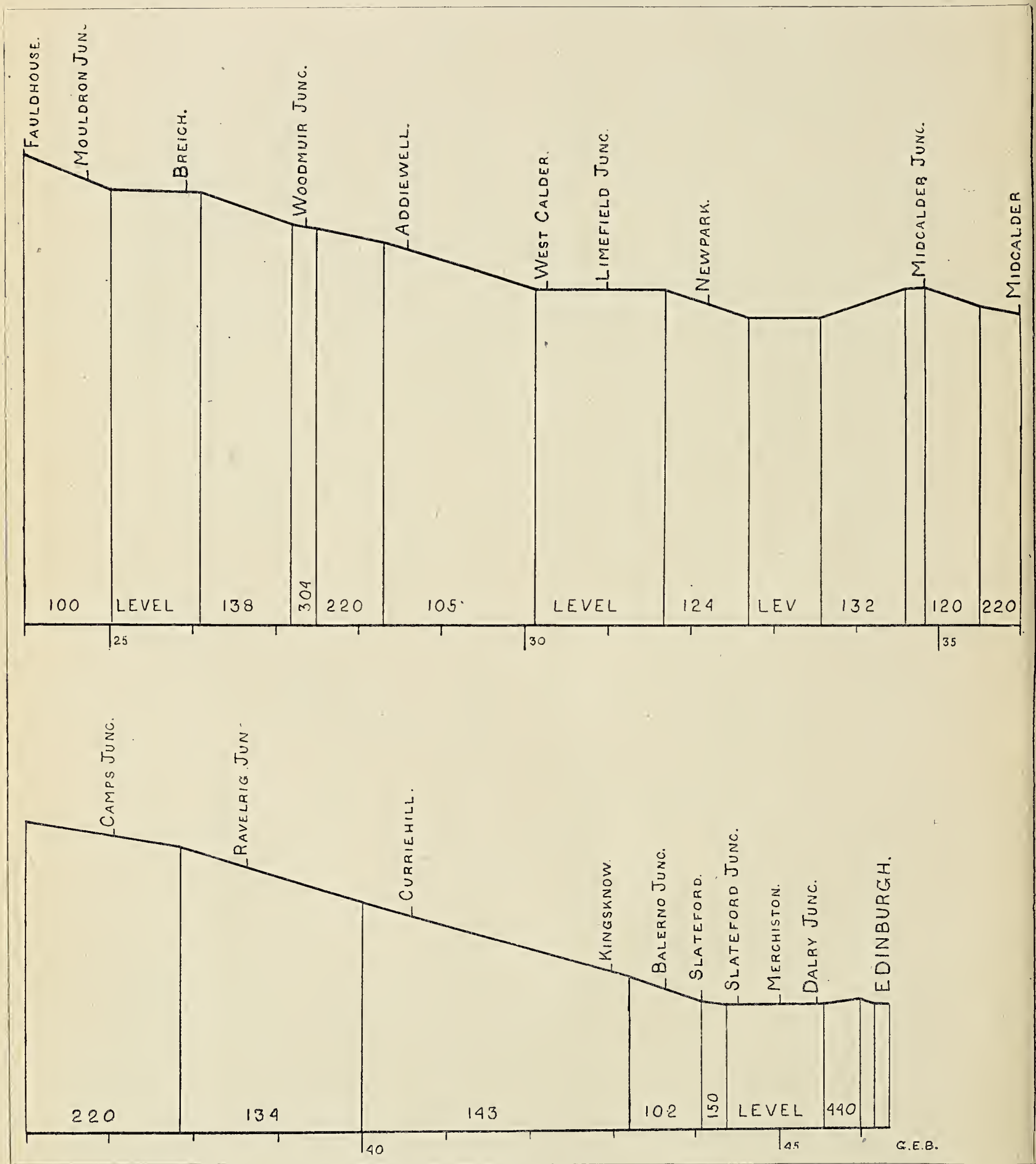
The first nine miles out from Glasgow Central differ so little from level that there is no need to describe them in detail, but after the ninth mile post a moderate upward slope begins, lasting for four miles. It starts at 440 (to beyond Howden), steepens to 280 for half a mile only, easing again to 365 for the same distance, continuing at 318 from just before Bishopston to the summit at the thirteenth mile. Thence follows a like downward slope, also, for four miles, beginning at 289, soon easing to 339, and (before Langbank) to 341; after a short strip of level the slope ends at 344.

The next three miles to Wemyss Bay Junction box are faintly rising ones, the first 1¼ all but level, and the remainder at 508 to 464; after the junction the Gourock line continues level, or almost so, to Greenock. The next mile has constantly changing grades (such as 385 downward and 250 up), but the rises and falls are very small. One and a half mile before the terminus comes a downward mile at 281 to 107—this last, which continues for about half a mile, is the only actual 'bank' in the whole section, but it comes somewhat awkwardly for up trains soon after the start. The last half-mile into Gourock is mostly level.



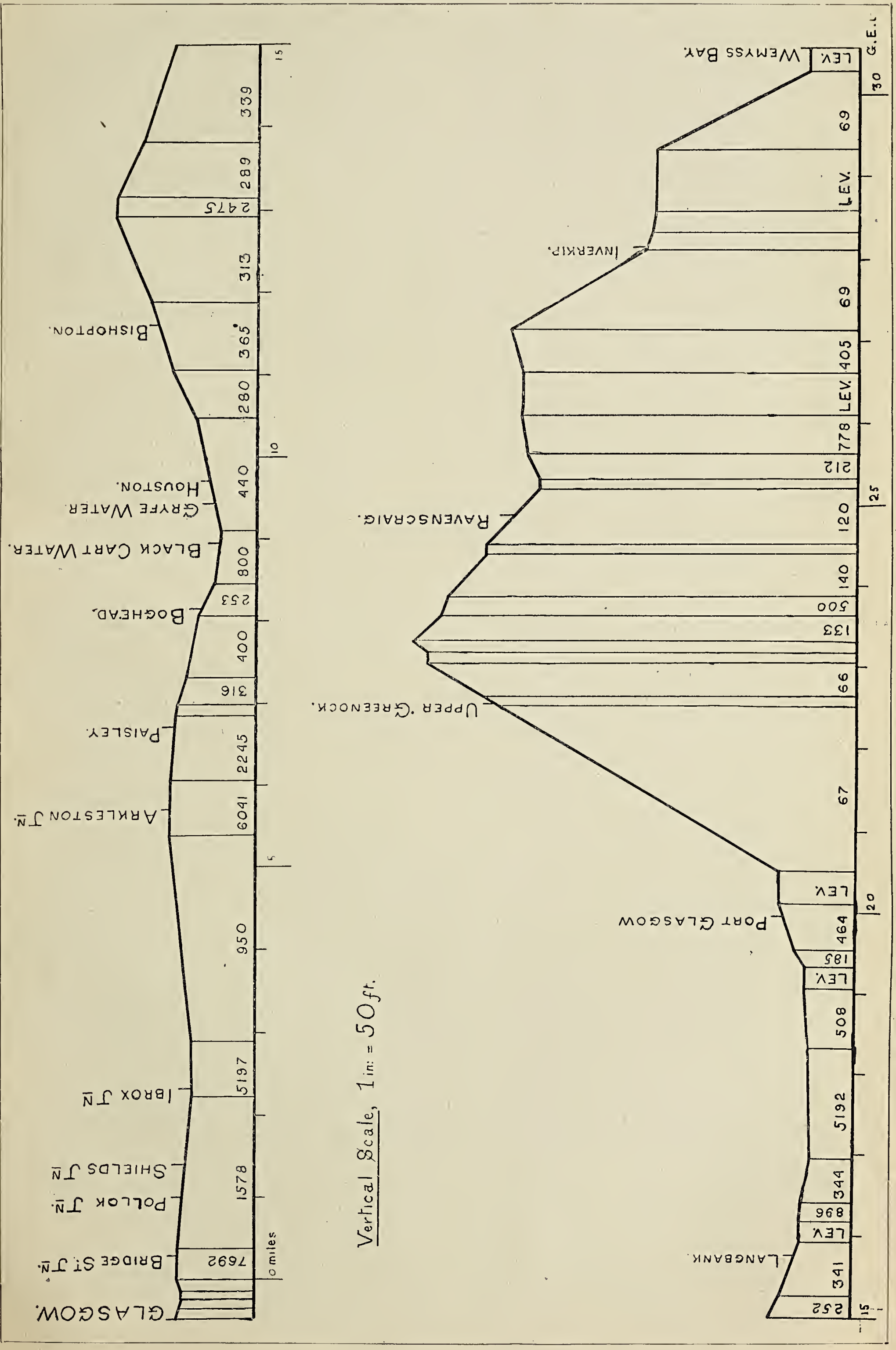
GRADIENT PROFILE OF CALEDONIAN RAILWAY BETWEEN GLASGOW AND EDINBURGH.

To Wemyss Bay things are very different, however. From the junction there is a 3-mile climb at stiff grades, the first 2 miles at 67½ to Upper Greenock, and the rest at 66½ and 76. This point is the summit-level of the branch, so down trains have a favourable run for the remaining 7 miles. The first two fall at 133, 140, and 120, with a short strip of level at the fourth mile from the junction; from the fifth to the seventh mile is all but level (rising at 405 towards the end); then comes another downward mile at 69 past Inverkip, then another almost level one, and a final fall for just over a mile, again at 69, to the Wemyss Bay terminus.



GRADIENT PROFILE OF CALEDONIAN RAILWAY BETWEEN GLASGOW AND EDINBURGH *(Continued)*.

It will be seen that trains starting from Wemyss Bay have a kind of staircase to climb for the first 7 miles, with two short 'risers' for the first and third miles, both at 69, and one longer one of 2 miles at an average of about 130, with two flat 'treads' of 1 mile and 2 miles respectively in between. When the gradients are considered it



GRADIENT PROFILE OF THE CALEDONIAN RAILWAY BETWEEN GLASGOW AND WEMYSS BAY.

will be admitted that good speed is made on this section, one train being booked to cover $7\frac{1}{2}$ miles from Wemyss Bay to Upper Greenock, including the stop at that station, in 15 minutes.

The Gourock line was one of the first in Great Britain on which passenger trains were regularly hauled by six-coupled engines. This was not—as many seem to think is the case—because of the gradients, which are easy on the whole, but because of the great length in the summer of the 'Clyde Boat' trains.

On the Callander and Oban line the gradients are almost continuously hard, and in places very severe indeed, but as no actual express work is done west of Callander, they do not come within the scope of these articles. On the whole one may safely say that no other line in Great Britain has such continuously difficult grades—within its 'express' mileage—as the Caledonian, and that no other makes such a relatively small use of 'pilots,' or of bank engines.

Note on the Comparative Gradients of the East and West Coast Systems, London to Kinnaber Junction (for Aberdeen).

Now that the profiles of the five railways which make up the two chief Anglo-Scottish through routes have been given in full, it may be as well to also give a comparative summary of the competing systems as a whole.

So far as actual heights reached, there seems hardly room for comparison; the West Coast road strikes through the Westmoreland hills, and crosses two mountain ranges in Scotland, rising twice to a height of over 900 (in one case over 1,000) feet. The East Coast way, on the other hand, touches no hill country nearly for its first 300 miles, while even among the Northumberland and Berwickshire hills it avoids any really high ground, so that its greatest summits are under 350ft. In fact, the highest point actually touched by an East Coast train is probably the Drumlithie summit, on Caledonian territory.

The following table of "summit points" makes this plain; but it should be noted that while the heights are (approximately) those above datum, King's Cross Station stands only 52ft., whilst Euston is 108ft., above their respective datums (ought one to write "data"?) As both termini are almost on the ground level of the Euston Road, this difference is chiefly due to the fact that no two engineers ever seem to take the same level for their datum-line. On the other hand, both routes fall almost to sea-level at various points.

EAST COAST.

Miles from K.C.	Summit.	Approx. height.
$12\frac{3}{4}$	Potter's Bar, G.N.	326 ft.
100	Stoke Box, G.N.	347 ,,
	Reilly Mill (Durham), N.E. ..	260 ,,
	Grant's House, N.B. (N.E.) ..	320 ,,
	Markinch—Falkland, N.B. ..	

WEST COAST.

Miles from Euston.		Approx. height.
31	Tring, L.N.W.	416 ft.
$147\frac{1}{2}$	Whitmore, L.N.W.	388 ,,
$256\frac{1}{4}$	Grayrigg, L.N.W.	600 ,,
$267\frac{3}{4}$	Shap (summit)	914 ,,
$349\frac{1}{8}$	Beattock Summit, C. (10 miles N. of Beattock stn.)	1,015 ,,
$434\frac{3}{4}$	Crieff Junction, C.	420 ,,

Miles from K.C.	Miles fm. Eust.	
$500\frac{1}{4}$	$516\frac{1}{2}$	Drumlithie, C. & N.B. 350 ft.

Much depends, however, on the way in which the hill tops are reached. Swindon—for example—lies many feet above Paddington, but the line between the two is the easiest 77 miles in Great Britain, there being no perceptible gradient the whole way. So it is with nearly all the London and North-Western main line south of Carnforth; except for quite short bits, the steepest grade is 1 in 320, and often as easy as 440 or 500.

The East Coast Railways, though their lines climb to no great height, rise and fall fairly sharply—especially the Great Northern, south of Grantham, and the North-Eastern, north of Ferryhill, at 200, 190, etc., with considerable slopes at these gradients. Still, for trains of average weight—still more for very heavy ones—the Western route is undoubtedly the harder of the two.

(To be continued.)

Sept 1903

practicable: King's Cross, dep. 3.30; York, arr. 6.30 [speed $62\frac{3}{4}$ miles per hour]; York, dep. 6.35; Newcastle, arr. 7.55 [speed 60 2-3, with allowance for curves]; Newcastle, dep. 8.0; Waverley, arr. 10.0 [speed $62\frac{1}{4}$ miles per hour]; Perth, arr. 11.5; Dundee, arr. 11.10—say three days a week to each of these towns alternately.

Or, even more attractive to the London tourist:—

Paddington, dep. 8.30 a.m. (with breakfast car); Exeter, arr. 11.35 a.m.; Dawlish, 11.55; Teignmouth, 12.5; Newton — for all Dartmoor — 12.15; Torquay, 12.35; all South Devon, in fact, between breakfast and lunch.

P.S.—As a help towards realising what the timing might be on our chief lines, I add the following table of what a train run at the *same speed* as the Great Western 'record' one would do on the North-Western, Great Northern and North-Eastern main lines:—

L. & N. W. (Times, after leaving Euston.)				G. N. (Times, after leaving King's Cross.				N. E. (Times, after leaving York.)			
		h.	m.			h.	m.			h.	m.
Tring ..	.. pass.	0	31	Hatfield ..	pass.	0	18	Thirsk ..	.. pass.	0	$21\frac{1}{2}$
Bletchley	.. ,,	0	$42\frac{3}{4}$	Hitchin ..	,,	0	30	Northallerton	,,	0	$28\frac{1}{2}$
Rugby ..	.. ,,	1	$12\frac{2}{3}$	Huntingdon ..	,,	0	52	Darlington ..	,,	0	40
Nuneaton	.. ,,	1	24	Peterboro' ..	,,	1	$7\frac{1}{2}$	Durham ..	,,	0	59
Stafford	.. ,,	1	$58\frac{2}{3}$	Stoke Box ..	,,	1	26	Newcastle ..	,,	1	$10\frac{3}{4}$†
Crewe ..	.. ,,	2	$18\frac{2}{3}$	Grantham ..	,,	1	31	Morpeth ..	,,	1	23
Wigan ..	.. ,,	2	$52\frac{1}{2}$	Newark ..	,,	1	46	Alnmouth ..	,,	1	$41\frac{1}{2}$
Preston ..	.. ,,	3	11	Retford ..	,,	2	$2\frac{3}{4}$	Berwick ..	,,	2	10
Lancaster*	.. ,,	3	37	Doncaster ..	,,	2	$16\frac{1}{3}$	Dunbar ..	,,	2	$36\frac{1}{2}$
				York ..	.. arr.	2	48	Edinburgh ..	arr.	3	6

* This time includes the lowered speed of the Great Western train after Exeter.
† By new loop and bridge at Newcastle, running through Central Station without stop.

W. J. SCOTT.

Photo] CALEDONIAN RAILWAY. [*Mr. Tom M. L. Neish.*

Oban Train in Crainlarich Station. 4-6-0 Engine No. 52.

The Forth Bridge's Biggest British Rival.

The Ballachulish Extension of the Callander and Oban Railway.

THE original Act for the construction of the Callander and Oban Railway was obtained in 1865, the total authorised capital being £800,000. The Scottish Central Railway undertook to subscribe £200,000, and certain local gentlemen, who were elected Directors, undertook to raise by local subscription another £100,000. Under this Act the line was constructed from Callander to Tyndrum in two sections: first from Callander to Glenoglehead, a distance of 18 miles. This portion was opened for traffic in 1870; from Glenoglehead to Tyndrum, another 17 miles, was opened for traffic in 1873. At this stage, for want of support, the Callander and Oban Railway had to apply for an Act authorising the abandonment of the remainder of the original railway, and reducing the capital to £325,200. But in 1874 the Company applied for a new Act for the line from Tyndrum to Oban, with a pier at Oban, and under this Act the next section, 12 miles in length, was constructed to Dalmally, and opened for traffic in 1877, and after that the remainder of the railway—some 25 miles long—was constructed from Dalmally to Oban, and opened for traffic in June, 1880. The traffic has gradually, though slowly, continued to develop since. As the whole district may be called inland, the line was constructed in about 18-mile sections to secure economy, with the result that the capital expenditure upon railway and pier, sixteen years after the line had been opened, stood at £20,000 less than the original estimate. This, we believe, is unique in railway enterprise. The first engineers were Messrs. Blyth and Cunningham, but for the section from Dalmally to Oban Mr. John Strain, of Glasgow, was the responsible engineer.

In 1896 and 1897 the Callander and Oban Railway applied for Acts of Parliament to construct a line from Connel Ferry to Ballachulish, seeking additional capital to the amount of £360,000; and under this Act the line to Ballachulish has been constructed, and was opened for traffic on August 21.

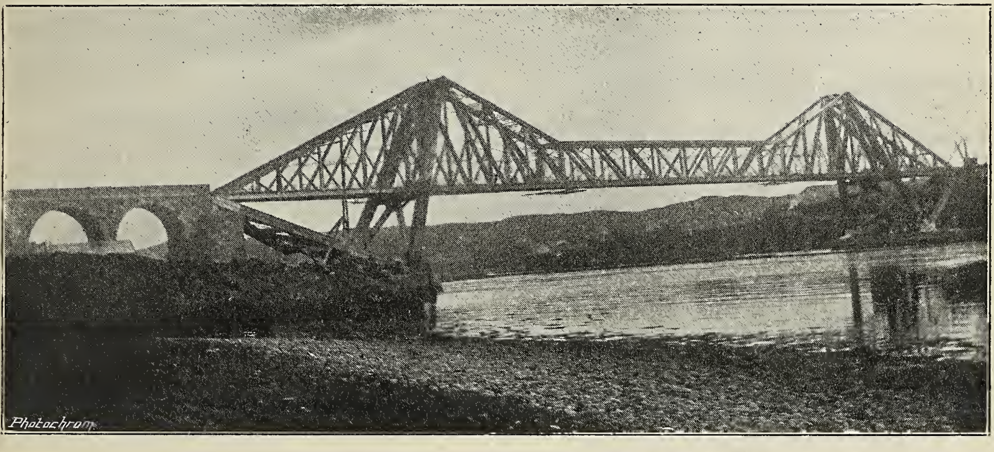
The new line, generally, has not been difficult to construct, with the exception of two bridges over arms of the sea, viz., across Loch Etive at Connel Ferry, and across Loch Creran at Creagan Ferry, of both of which important bridges we give photographs.

The Connel Ferry bridge (illustrated on page 239) is said to have the longest span of any railway bridge in this country, with the exception of the well-known Forth Bridge.

This cantilever bridge crosses the narrowest part of Loch Etive at Connel Ferry, close to the falls of Lora, which at spring tides have a drop of about 4ft. in a length of 100 yards, or thereabouts. The current, both at flood and on ebb, is very rapid. The average velocity cannot be less than 10 or 11 knots at ordinary spring tides. This current not only made it necessary to place the piers for the bridge clear of the channel, towards the sides where the current is somewhat slacker than in the middle; but it also rendered it impossible to have any temporary staging over the waterway, and thus the cantilever form of structure was considered the most suitable. The total width of the waterway is 690ft., and the two piers are 524ft. apart, centre to centre; the clear span, as we have said, is 500ft., while the headway is 50ft. between high-water level and the under side of the central girders. The total height from high water to the highest point of the bridge is 125ft. The independent middle span, which is carried by the two cantilever spans, has a length of 232ft., but, as is usual in such structures, this centre span was built out in continuation of the cantilevers from each end, temporary connections being made at the ends of the centre span until a junction was formed at the centre of the structure.

The design consists essentially of two main legs or supports, resting upon each pier and spreading outwards towards the bottom when viewed in cross-section, so as to give the necessary stability to the structure, and leaning towards the middle of the waterway at the top, so as to shorten the overhanging parts of the cantilever trusses suspended from the top of the main legs. The latter are held back by tie-booms, which form the upper members of the cantilever trusses, while the shore ends of the trusses are anchored down to the masonry of the abutments by massive steel ties and anchor girders. Access to these anchoring members for painting purposes, etc., is obtained through a subway, by an opening in the face of each abutment, about 10ft. above water-level. The shore ends of the cantilever trusses are connected to the bases of the main legs by long struts, which, with the tie-booms and main legs, form triangles.

The land approaches consist of three masonry arches on each side, each of 38ft. 6in. span, and the width of the piers is 22ft. 4in. These lead up to the solid masonry abutments of the bridge, each 45ft. wide, within which are the anchor girders. These anchor girders are carried to a depth of 50ft. below rail-level, and the masonry around and above them weighs about twice the amount of the maximum upward pull on the anchor ties of the cantilever trusses. The two main piers of the bridge were built within cofferdams in the shallow water, and are founded on the solid rock. The piers, of solid masonry, are 24ft. wide at the top, and 110ft. long. Upon the top of each pier rest the two built-up wrought steel bases for the main legs; the bases are 14ft. by 10ft., each exposed to a maximum load of about 1,500 tons. The main steel structure carries one line of rails and a footway, the total width between the centres of the main girders being 21ft. 6in. The cantilever trusses and the main girders of the middle span are all built in the vertical plane, but owing to the great length of the bridge in proportion to its width, and the consequent heavy collective wind pressures which might be exerted against it, it was found necessary to provide supplementary lower booms spreading outwards from



CONNEL BRIDGE.
View of the Railway Bridge across Loch Etive, at Connel Ferry.

the two ends of the cantilever trusses, and meeting at obtuse angles between the main legs, where the width between the outer booms is increased to 43ft. At these points the outer booms are fitted with brass rubbing-pieces, which, in the event of side pressures due to the wind, bear against similar rubbing-pieces attached to the main legs. The greater proportion of the stresses coming upon the inner booms are conveyed to the outer booms by means of horizontal raking struts, inserted diagonally between the booms at each point of triangulation.

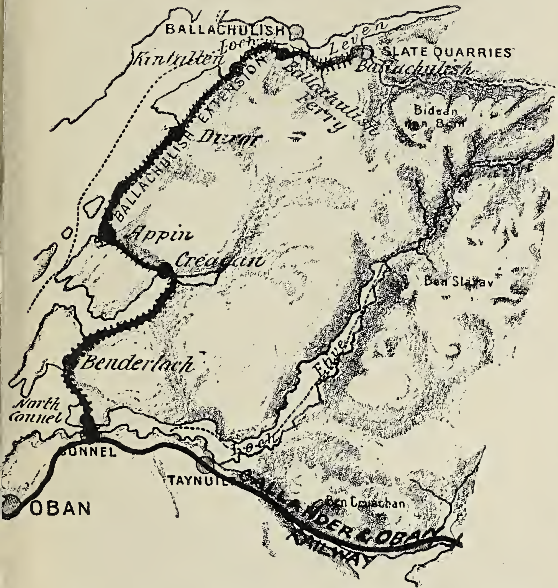
The main members of the cantilevers are of box section, built up of plates and angles, the measurement of the cross-section of the main leg being 6ft. 7in. by 4ft. 6in. The webs are stiffened with tees and angle-irons riveted outside, as may be seen by a reference to the photograph. The booms are built up of U section, and the anchor-ties of flat plates braced with angles. The top booms of the main trusses are braced together diagonally and transversely. These members are built up of channel flanges and lattice connections. The main girders are also braced in the vertical plane.

The work of constructing the bridge was commenced in 1898, the first operations being the building of the masonry abutments and piers. The steel work was commenced in May, 1900, at both shores of the loch, and was completed in June, 1903, the total quantity of steel used in the structure being nearly 2,600 tons. The first operation in connection with the steel work was the construction of the tie-beams embedded in the masonry beneath the base-plates of the main legs, so as to prevent the masonry from opening under the spreading action of the legs. The base-plates were then got into position, and the main leg and back struts commenced.

When the work had been carried out as far as the piers, the remainder of the structure was erected without staging, the supports for the crane being telescoped on the cantilever system in advance of the work, the crane being erected on an eight-wheeled trolley, heavily loaded with kentledge on the shore end, and projecting at the other end so that the crane could command a considerable distance in advance of the work already erected without any chance of overbalancing. The crane thus supported each additional member until it was bolted in position.

During erection, the girders of the middle span were built out as cantilevers from the ends of the cantilever trusses by means of long temporary bolts with screw nuts, which were provided at the eight points of connection between the booms of the cantilevers and those of the middle span. The last closing length of the structure was inserted in position on May 9th of this year.

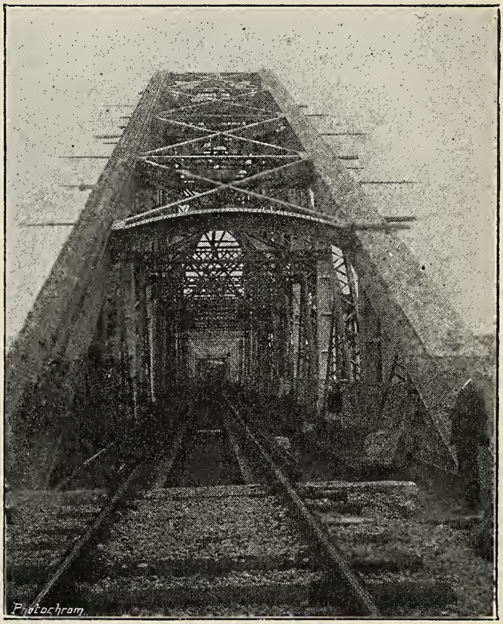
In order to provide for expansion or contraction due to variation of temperature on long-span cantilever railway bridges, it has been hitherto the practice to scarf the rails by cutting them diagonally along a vertical plane, so as to enable them to slide past one another to suit any movement of the main structure; but on the Connel Ferry Bridge, owing to there being only one line of rails for up and down traffic, this was considered objectionable, as the point of scarfing would necessarily become a facing point in one direction, either for the up or for the down trains. Moreover, scarfing in the ordinary way would not be easy with the ordinary bull-headed rails used on the lines worked by the Caledonian Railway. The means adopted at the Connel Ferry Bridge to overcome the difficulty was got over by inserting a joint rail outside the running rails, to carry the wheels across a 3-in. gap left in the ordinary running rails at the junction of the middle span with the ends of the cantilever spans. The joint rail was brought close up to the outside of the webs of the running rails by cutting away the outside portions of the latter. The top of the joint rail has its top surface gradually curved upwards towards the centre of the gap, so that when the wheels cross the gap in the running rails, the outer half of the tyres takes a bearing upon the joint rail. The ordinary rails weigh 85lb. per yard. The longitudinal sleepers are of Jarrah wood, 6in. by 13in., laid in the troughs of the rail-bearers, and run in with asphalte. Guard-rails are used on the bridges, and special chairs are employed to carry both the running and the guard rails.



MAP OF THE BALLACHULISH EXTENSION OF THE CALLANDER AND OBAN RAILWAY.

The Creran bridge (illustrated on page 242) has two principal spans over the waterway, each 150ft. 4$\frac{1}{2}$in. in the clear, with a headway above high water of 40ft. The centre pier in the loch is constructed on two 12ft. cylinders 20ft. apart between centres, sunk down into the solid rock and filled with concrete. The two cylinders are connected on top by a granite arch, and above them the upper portion of the pier is built in granite. The total height from the foundation to the girder bedstones is 88ft. The girders are of the lattice type, with raking ends, built up in 17ft. 6in. bays. The total depth of the girders is 18ft. 7in. There is a footway carried on cantilever brackets on the outside of one of the lines of girders, and the flooring generally is similar to that in the cantilever bridge over Loch Etive.

The railway was constructed to the designs and under the supervision of the engineers, Sir John Wolfe Barry and Messrs. Formans and McCall; and with them were associated in the design and construction of the two large bridges Sir John's partners, Mr. H. M. Brunel and Mr. E. Cruttwell. The resident engineer was Mr. A. J. Pringle. The contractors were Mr. John Best, of Edinburgh, for the railway, and Arrol's Bridge and Roof Company, Limited, of Glasgow, for the steelwork of the bridges, which was started under the immediate superintendence of the late Mr. Arthur Arrol, whose



CONNEL BRIDGE.

View through the Bridge across Loch Etive at Connel Ferry.

health failing, the services of Mr. H. Cecil Booth, of London, were obtained, and under the latter engineer's superintendence both bridges have been satisfactorily finished.

The district through which the railway from Connel Ferry to Ballachulish passes is full of interest, and much might be written about its traditions and Clan feuds, but hitherto it may be said to have been "sea locked," as it could hardly be visited without crossing one of the most uninviting ferries in Scotland, and with the tides running sometimes upwards of 10 miles an hour, this was no inviting task.

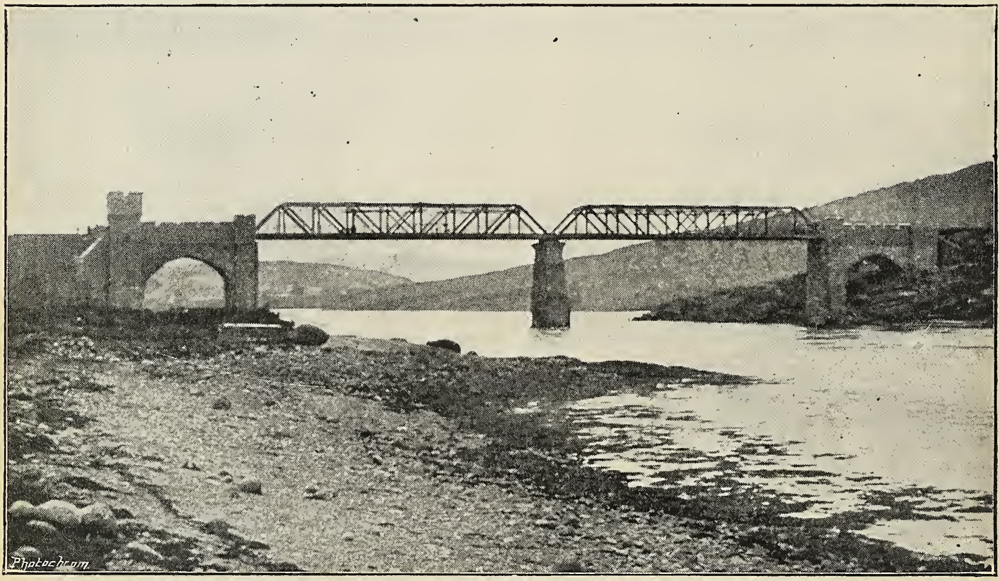
The new railway skirts part of Loch Etive, Loch Creagan, Loch Linnhe, and Loch Leven, all salt water lochs, or arms of the sea. The hills are high and the glens are deep, and there is recreation in the district for every reflective mind, no matter what hobby may be the desire of the individual.

The development of the Callander and Oban Railway may be said to have been fairly satisfactory, notwithstanding its difficulties in early days, and in addition to full interest on its preference capital, it has paid its ordinary shareholders an average rate of $2\frac{1}{4}$ per cent. during the last ten years, and the Ballachulish Extension is expected to be a substantial feeder to the present line.

As will be seen by the map on page 241, the new line commences by a Y junction, so that trains from the South will pass on to the Extension by the curve south of Connel Junction; for the present the spur line, with facing points towards Oban, will not be used.

The stations are situate at North Connel, Benderloch, Creagan, Appin, Duror, Kenfallen, Ballachulish Ferry, and Ballachulish, and are $\frac{1}{2}$, 3, 10, 13, 19, 23, 25, and 27 miles respectively from Connel Ferry. The gradients generally are easy, although there are some lengths under 1 in 100, the steepest being 1 in 70, at which rate there are several stretches. The summit is situate about 21 miles from the junction.

The line is single throughout, with passing places at all stations, except Ballachulish Ferry, and is worked on the train-tablet system. The line will



CREBAN BRIDGE CARRYING THE BALLACHULISH EXTENSION OF THE CALLANDER AND OBAN RAILWAY OVER LOCH CREAGAN.

be worked by the Caledonian Railway (which also works the Callander and Oban Railway), and there will be a service of five passenger trains each way, daily, during the summer time, and three each way, daily, during the winter; all having connections to and from Oban and the South.

The station fencing is formed by expanded metal panels (steel), with iron standards, and is the first introduction of this material—manufactured by the Expanded Metal Company, Limited, of London—for this purpose. It is strong and yet of light appearance, and seems to our mind a happy adaptation.

The line was inspected by Lieutenant-Colonel Yorke, of the Board of Trade, on August 13th and 14th, and was formally opened to the public, August 21st. Connel Bridge was subjected to a very heavy test. No less than eight engines, three tenders, and a number of heavily-loaded mineral wagons, covering the entire length of the bridge, weighing on an average 1½ tons per lineal foot of line, when the minimum deflection at the middle of the bridge turned out to be exactly as calculated, viz., 3in.

* * *

IMITATING THE FORTH BRIDGE.

In the Railway Magazine for September, 1899 (page 211), we gave some particulars of a new line under construction by the Caledonian Railway, in the North-West Highlands of Scotland, from Connel Ferry to Ballachulish, a distance of about 26 miles. The country, however, does not readily lend itself to railway extension, owing to the irregularity of the coast-line and the various intervening arms of the sea, which have either to be circumvented or bridged across, with the result that in one or two cases bridges of considerable magnitude are involved—hence the apparently long time the railway has been under construction. The principal of these occurs at Connel Ferry, where the line is carried across Loch Etive, immediately below the famous Falls of Lora. Owing to the navigation for small steamers and other craft to the upper loch having to be preserved, and the difficulty of forming piers in the rapid-running tideway, the design has taken the form of a clear span of 500ft., and when completed the bridge will be distinguished as the second longest clear-span railway bridge in Europe, the Forth Bridge taking precedence. The design adopted is that known as the cantilever, which, as the adoption of long spans has become more general, has been found to lend itself most readily to erection, when the space to be bridged over is difficult of access for purposes of temporary supports. The elevation of each cantilever is formed of three main members, composing a large triangle, a horizontal rail-bearing member extending over the waterway, and braced in connection with a fifth member, or tie, from the apex of the large triangle. Resting between the extremities of these two arms, which project towards one another from either side of the channel, is a girder span of 232ft. The whole weight of the bridge and its load is carried at the lower points of the large triangle, which rests on granite piers, and to meet the tendency to tilt seawards about these points, the landward arms of the cantilevers are anchored down to the masonry piers, which form the ends of the arching or approach viaduct. The entire superstructure will be of steel. An access for foot passengers is provided across the bridge, and the clear height above ordinary high tide will be 50ft. With such an elevation, combined with its magnitude and simplicity of design, the bridge will prove an imposing structure. The bridge is the design of Sir J. Wolfe Barry, K.C.B. The contractors for the steel work are Messrs. Arrols' Bridge and Roof Company, of Glasgow, and for the mason work, Mr. John Best, of Edinburgh, who is likewise contractor for the remainder of the railway works.

R.M. Oct: 1902

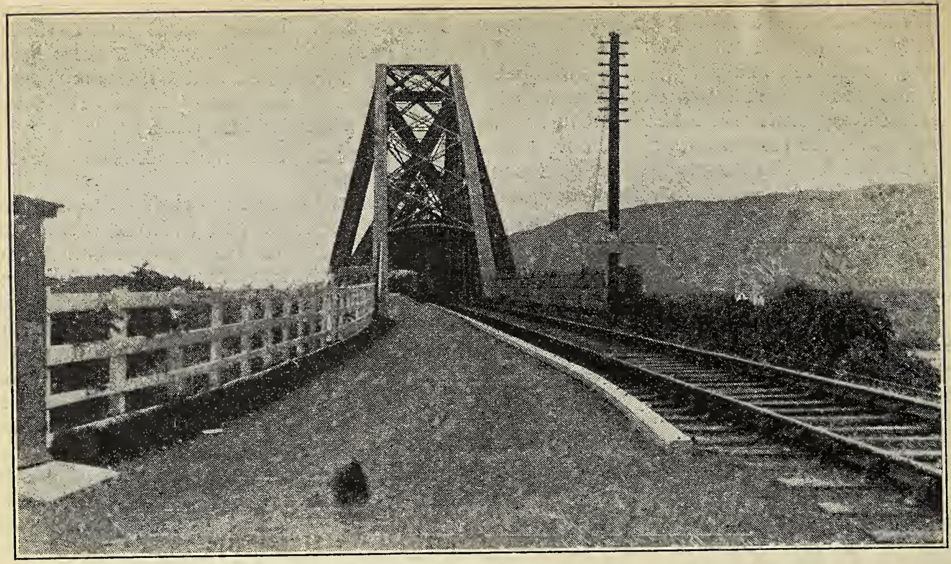


Photo.] **CONNEL FERRY BRIDGE, CALEDONIAN RAILWAY.** [*J. F. Gairns.*

Showing roadway for road traffic alongside rails.

Railway and Road Traffic on Connel Ferry Bridge, Caledonian Railway.

The Connel Ferry bridge, claimed to be the Forth Bridge's "biggest British rival," is situated on the Ballachulish Extension of the Callander and Oban Railway, worked by the Caledonian Company. It was opened for traffic on August 21, 1903. The bridge, which is of cantilever type (hence the analogy suggested with the Forth Bridge), has a length of 524 ft. between the two piers, the clear span being 500 ft., and the headway above high-water level, 50 ft. Extreme height from high water to the topmost point of the bridge is 125 ft., while the middle span, carried by the two cantilever spans, has a length of 232 ft. This bridge not only enabled a district previously most inconveniently situated in regard to rail traffic to be placed in communication with the Callander and Oban Railway at Connel Ferry, but provided a means of crossing Loch Etive where hitherto a very lengthy detour had to be made to get from one side to the other, the only alternative being a very uncertain ferry service.

The difficulty having been solved from the railway point of view, there still remained the problem of providing for the transit of motor cars and other road vehicles across the Loch, and for several years after the opening of the bridge the Caledonian Railway conveyed private motor cars across the bridge by placing them on flat trucks and hauling them, passengers included, by road motor vehicles adapted to run on rails across the bridge.

This method, as indicated, was continued for a considerable time, but, several years ago, the Caledonian Railway Company adopted the alternative method of adapting the bridge also for the passage of motor vehicles, cycles, &c., under their own power. There is not, however, sufficient room for a roadway clear of the railway track, so that it is necessary to restrict the passage of road vehicles to periods when no train is signalled. At each end of the bridge, therefore, gates under the control of the bridge-keeper are provided to close the bridge to road traffic when a train is due, and the tablet instruments are controlled by electric circuits in connection with the road gates to ensure that unless the gates are properly closed a tablet cannot be used. The roadway comes close up to the railway rails, there being just sufficient room for a vehicle to traverse the bridge, though the bridge-keeper has to see that vehicles from both directions are not allowed at the same time. These facilities apply only to private motor cars and horse-drawn vehicles, but not to trade vehicles of either class. Provision, is however, made for its use by cyclists and by pedestrians. In each case the crossing of the bridge is subject to toll, the men in charge at the Connel Ferry and Benderloch ends acting as toll-keepers.

It may be mentioned that, in August last, the bridge was thus used by 6,009 foot passengers, by 852 motor cars, and by 290 cycles.

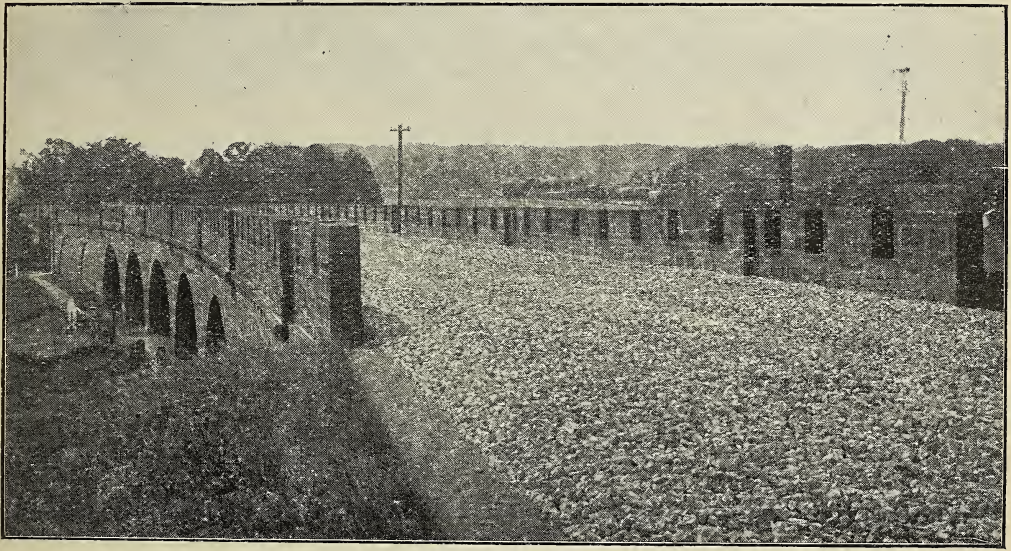
R.M. JAN: 1923.

The Disused Friockheim Viaduct, Caledonian Railway.

IN the article, "Disused Junctions and Connecting Lines in Scotland" in the June, 1919, issue of the RAILWAY AND TRAVEL MONTHLY, reference is made to the Friockheim Fork, a section of line one mile twenty-eight chains long, forming one side of a triangle. The spur in question is between Glasterlaw and Friockheim; on the other sides of the triangle, the lines are from Glasterlaw to Guthrie, and from Friockheim Junction to Guthrie. The line was opened in 1849, when this now disused and dismantled Friockheim fork formed an important loop in the route of the Aberdeen Railway between Aberdeen and Montrose and Dundee.

The section between Glasterlaw and Guthrie forms part of the Caledonian Railway's main line to Aberdeen, and was originally one end of the Aberdeen Railway, which joined the Arbroath and Forfar Railway, by a **Y** junction, the other arm of the **Y** being the now disused spur. In 1871 the North British Railway obtained powers to construct a railway from Arbroath through Montrose to the Caledonian Railway at Kinnaber Junction. About this time the Caledonian Railway, which some years previously had absorbed the Scottish North Eastern Railway (the latter having amalgamated with the Aberdeen Railway) ceased to run trains over the Friockheim fork, passengers to and from Arbroath changing trains at Guthrie Junction, as they do now.

The opening of the North British Railway to Kinnaber Junction introduced competition for the traffic between Aberdeen and Montrose and Arbroath and Dundee, so the Caledonian Railway re-opened the Friockheim fork in 1880, and ran a service of trains in competition with those of the North British Railway between those places. By the Caledonian route between Aberdeen and Dundee, a change of trains was made at Dubton, whilst by the North British service the trains ran through. The route was common to both railways between Aberdeen and Kinnaber Junction, and between Arbroath and Dundee. In 1892, from Aberdeen to Arbroath the



THE FRIOCKHEIM VIADUCT, LOOKING SOUTH FROM THE GLASTERLAW END.

This photograph shows the viaduct in its present condition, with rails and sleepers removed and ballast levelled. Friockheim station can be seen in the background, to the right.

best time by the North British Railway was 83 minutes, and by the Caledonian Railway only 89, although there was a change and wait at Dubton of five minutes. From Arbroath the North British Railway again had the best of the competition, its quickest train taking only 90 minutes to Aberdeen, against 104 by the Caledonian Railway, including 14 minutes wait at Dubton. The distances were 56 miles by the Caledonian Railway and only 54¼ by the North British Railway. Some of the Caledonian Railway trains were non-stop between Arbroath and Bridge of Dun, the best taking only 23 minutes.

By 1908 the North British and Caledonian railways (in the interests of their shareholders) had adopted the "lion and lamb" attitude, and ceased to compete, and in that year the service of all trains over the Friockheim fork was withdrawn.

On the disused spur is the Friockheim viaduct, a photograph of which we reproduce. The viaduct is situate a short distance north of Friockheim Junction. Friockheim Station (situate between Friockheim Junction and Guthrie Station —see plan on page 351 of the June, 1919, issue of the Railway and Travel Monthly) can be seen in the background. A reason for the abandonment of the Friockheim fork was that the viaduct, after so many years, was not sufficiently strong for the heavy locomotives, etc., of the present time. It will be observed that two of the arches have been filled in with brickwork, and the next two beyond have been strengthened by wooden upright baulks of timber, with diagonal struts.

There never was much traffic passing over the fork, and with the arrival of the no competition era the need for the few through trains ceased, the traffic by the Caledonian Railway route between the Aberdeen direction and Arbroath, Dundee, etc., being conveyed in main line trains to and from Guthrie, and in Arbroath branch trains thence, passengers changing at Guthrie. Under these circumstances it was not considered necessary to rebuild the Friockheim viaduct, and the fork was closed for traffic. This added 2¼ miles to the distance over that by the direct route *via* the Friockheim fork.

Mr. W. A. Paterson, the Chief Civil Engineer of the Caledonian Railway, has kindly supplied us with some interesting particulars regarding the Friockheim viaduct, from which we learn that the viaduct consists of nine spans, with a total length of 660 feet. Eight of these spans are arches, with a span of about 60 feet each, the remaining one, which crosses the public road, consisting of steel girders and has a span of 30 feet on the square. This was originally an arch similar to the other eight, but it was rebuilt in 1902, when steel plate girders and flooring were put in.

On the arches the railway is carried by six arched ribs of ashlar, spandril walls being carried up to the level of the top, and the spaces between covered over with flagstones, on which the ballast and permanent way were laid.

This was a somewhat common method of construction of the bridges on the Scottish North Eastern Railway.

The viaduct carried a double line of rails.

The urgent need for permanent way material for war purposes caused the Caledonian Railway to take up the rails, sleepers, etc., on the Friockheim fork in January, 1917, and the surface was levelled, as seen in the photograph. No use is now made of this spur, nor is it clear to what purpose it could be put.

Our thanks are offered to Mr. W. A. Paterson for the series of photographs of the Friockheim Viaduct he has taken for the purpose of this article. One of these photographs we reproduce.

◆

The Paisley and Barrhead District Railway.

Commenting upon previous references in regard to the former Caledonian line between Barrhead and Paisley, Mr. D. F. Johnston sends the following remarks based upon personal acquaintance with the district:—" This line was built about 1904, and known as the ' Paisley and Barrhead District Railway.' It commenced at the Greenock end of St. James station, Paisley, and curved to the west, and was double track for about half a mile. At this point there was a loop junction, so that trains could travel off the up Greenock lines. This junction is called Smithston. At one time the great coal firm of Merry & Cunningham had five ironstone pits working, but only one was in operation when the B & P. District line was opened. Continuing from the Loop Junction, the line carried on to Elderslie, and a passenger station island platform was built. The line then passed on to Glenfield, where another passenger and goods station was erected. It was single line between these points. Farther on a junction was reached called Gleniffer, and at this point a section of the railway ran to Paisley, where a passenger station was erected. Then the line continued from this point, double track, to near Arkleston Junction, on the Glasgow and Paisley Joint Railway, and, owing to the formation of the main lines and sidings at this place, the lines of the B. & P. District line finished right up to a stone boundary wall belonging to the G. & P. line, and, owing to some dispute, no junction ever was formed.

" From Gleniffer the line continued to Barrhead Central (double-line platforms) and then, curving north-west, joined the Glasgow, Barrhead and Kilmarnock Joint line about one mile south of Nitshill station. No passenger trains were ever run over this line, and I had frequently to travel over the section on the engine of the goods and mineral trains which run over the line from St. James to Barrhead—one train each way per day.

" The line has severe gradients, and loads did not exceed 30 wagons ; in fact, it was seldom that such a load was hauled, as there was very little traffic. No trains were run on the Gleniffer to Arkleston section. The G. & S.W. had a single line for goods traffic to Gleniffer off their district line, which was built at the same time as the B. & P. District. The G. & S.W. station at Barrhead is situated just below the B. & P. station on this G. & S.W. section. Passenger trains were run to Paisley Canal line, but were discontinued, I think, about 1911. At the time the Barrhead District line were building, a new addition was being made to the Lanarkshire & Ayrshire Railway, from Cathcart to Newton, on the main line ; also a new connection about three-quarters of a mile long from Lugton, L. & A., to Lugton, G.B. & K. line. Another extension of the L. & A. Railway was from Burnside (Cambuslang) to Carmyle, with a connection to the lines leading to the Glasgow Central Railway, underground, from Parkhead to Partick, via Bridgeton Cross and Glasgow Central Low Level station. The Central Low Level was, of course, opened in 1896. All these lines, with the exception of the Glasgow Central Railway, were the outcome of the extension policy of the late Sir D. Matheson, who was first chief engineer, and latterly chairman, of the company. It is interesting to observe that in the latest railways of Scotland map, issued by the L.M.S., the Barrhead District railways are not shown. I should mention that I remember the alterations made to Ferguslie station, to convert them into dwelling houses for the local platelayers, and for the children using the platform (island) as a playground. A Drummond 0-6-0 tender, No. 689, was for several years the regular daily engine working the section. This engine was stationed at Polmadie Sheds."

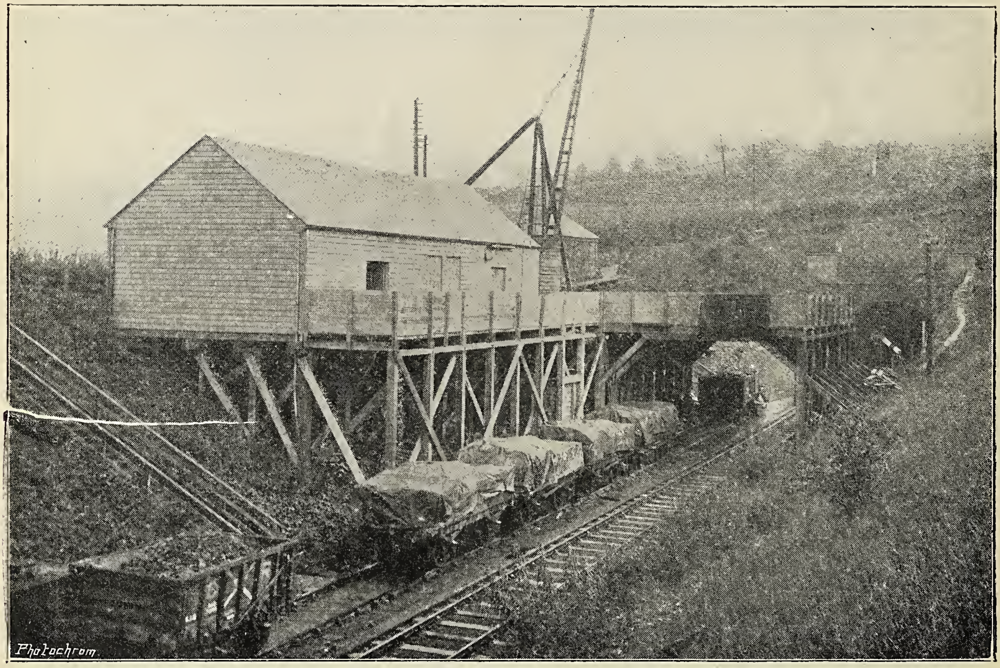
Dec: 1930.

Feb. 1904.

The Reconstruction of Moncrieff Tunnel, Caledonian Railway.

By S. A. F.

THAT tunnels are a most expensive portion of a railway system, both to construct and to maintain, is a fact which experience has proved to railway engineers, and one which at the present moment is being forced with some emphasis upon the attention of the proprietors of the Caledonian Railway.

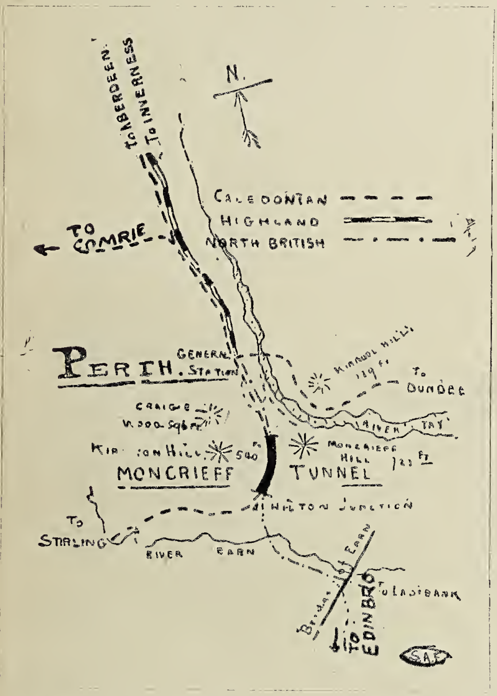


CONCRETE-MAKING MACHINE AND ENGINEERING WORKS AT THE ENTRANCE TO THE MONCRIEFF TUNNEL.

Moncrieff Tunnel, 1,216 yards in length, is situated on the main line, about a mile south of Perth. It was constructed by the Scottish Central Railway at a cost of a guinea per lineal inch, and opened in May, 1848. Cutting through a shoulder of Moncrieff Hill, it enables the railway to pass from Strathearn into Strathtay, and its importance to the Scottish systems can be judged from the map on page 143.

By the Acts of Parliament authorising the amalgamation of the Scottish Central and Scottish North-Eastern Railways, with the Caledonian, the North British Railway was granted running powers over both the absorbed systems, these powers being at present fully exercised between Hilton Junction, where the old Edinburgh, Perth, and Dundee Railway (now merged into the North British Railway) meets the Scottish Central and Perth, the North British trains to that city passing through Moncrieff Tunnel, as well as those of the owning company. At the present time there are about 200 trains passing through daily on week-days, and about thirty-five on Sundays, three-fourths being Caledonian and the remainder North British trains.

The geological formation of Moncrieff Hill is volcanic, and consists mainly of a bastard whinstone with veins of marl and quartz. From various parts of the rock, water springs in great abundance, and has been a source of considerable trouble and annoyance to the permanant way department since the opening. This water, percolating through fissures in the rock, combined with the fumes from the passing locomotives, has in parts detached large portions of the rock from the roof of the tunnel, from which, however, no accidents have ever occurred.



MAP SHOWING RAILWAYS IN THE VICINITY OF THE MONCRIEFF TUNNEL.

So numerous did these rockfalls become, that every Sunday a thorough examination was made, and any dangerous portions then visible, removed. This systematic inspection revealed the fact that the rock was so rotten in parts as to be actually dangerous, and that a heavy expenditure was necessary to make the tunnel again secure.

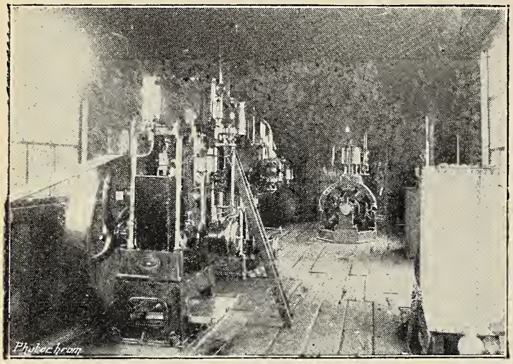
Several schemes were propounded, but ultimately it was decided to cut away as much of the rotten rock as was necessary, line the whole with brickwork, having a minimum thickness of six courses, and give the tunnel a uniform width of 26ft. 6in.

To do this without interfering with the traffic has proved to be no light task, and the work commenced in November, 1901, has progressed steadily since, and at a cost of over £50,000, and it is hoped to finish the work by April, 1904.

The first step taken in the work was to remove the "up" metals altogether, and slew the "down" road into the centre of the tunnel, making a single line block, controlled by two of Tyer's patent electric tablet instruments, between Friarton South Box at the North entrance to the tunnel, and Hilton Junction Box at the South end. The next step was to lay down narrow (12in.) gauge metals at each side of the tunnel, clearly shown in the illustration at the bottom of page 144, to convey materials to, and *débris* from the workings.

Upon these lines huge shields, constructed of steel framework with lining of wood and shaped to the arch of the tunnel, were constructed to move. They were built up outside the tunnel, three at the north end and one at the south, and run in as the work progressed. The workers in these were thus protected from passing trains, and were enabled to hew and build in perfect safety, with trains passing closely below and beside them.

Owing to the risk of dislodging rock that might cause detention or dislocation of traffic, blasting has not been resorted to, the whole of the excavation being done by drills and wedges and sledges. In parts, owing to the hardness of the rock, this has involved enormous labour, while where the rock was very rotten large quantities have had to be removed. At one part where it was especially bad, a brick arch 11 feet 9 inches thick at the top has been built.

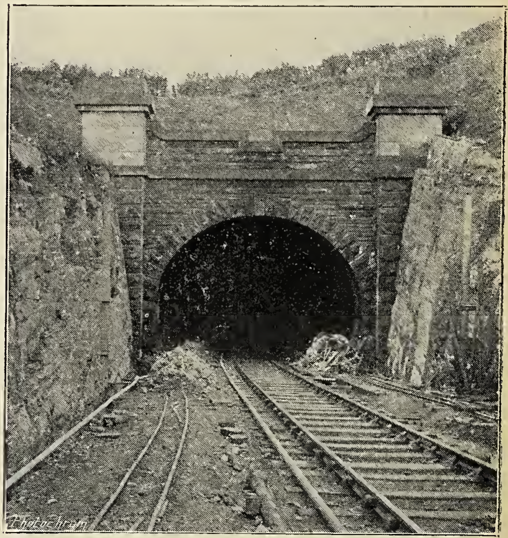


MACHINERY FOR SUPPLYING ELECTRIC CURRENT AND COMPRESSED AIR AT MONCRIEFF TUNNEL WORKS.

The centerings for the building of the roof arch are so ingeniously arranged with props and adjusting wedges that by knocking out the latter, the centering can be lowered on to one of the shields, which is then moved along the rails to a prepared hewn space, the props again inserted at the sides, the centering wedged into its proper position, and the work proceeds. Six bricklayers work on each building-shield at one time, the hewers working in a separate one in advance, while the hewn out space betwen the shields is utilised to store bricks for the bricklayers. An effort is made each Sunday, when traffic is light, to take in as many bricks as will do a week's building, and at the same time remove as much *débris* as possible.

Two trains of wagons, one working from either end, are employed each Sunday on this work. It is intended to make the tunnel waterproof, and to this end the lining is built of best red bricks, faced with "Nellfield" blue brick, the whole built together with Portland cement (2 parts cement, 1 part sharp sand). The springs are being led to culverts, and thence to channels at the sides of the line. During the work the whole length is lit by electricity, about 350 lamps being in constant use. The current is generated by two sets of engines and dynamos, which, together with an air compressor plant, supplying fresh air to the workers in the shields, occupy a specially built power house, an exterior view of which we give on page 142, whilst the machinery is shown on this page.

The men work in shifts of eight hours each, and are paid at an exceptionally high rate, one shilling per hour being labourers' pay, while the hewers, who are nearly all Welsh or Cornishmen, and the bricklayers, are paid proportionately. Notwithstanding the high pay, the works have never been overstaffed, the atmosphere, in spite of the use of every known contrivance to purify it, being at times extremely unpleasant. When completed, the tunnel will rank as one of the finest and safest in the kingdom, and, with the new entrances of Dumfries red freestone, as handsome as a tunnel can be made. For permission to take the photographs published herewith, thanks are due to W. Stevenson, Esq., Telegraph Supt. Caledonian Railway.



NORTH ENTRANCE OF THE MONCRIEFF TUNNEL SHOWING THE NEW STONEWORK.

* * *

CALEDONIAN.

THE arrangements have now been practically completed for the extension of the Central Station of the Caledonian Railway, Glasgow. For some time past the Railway Company have been purchasing property on the south side of Argyle Street, and they are now in a position to take the necessary steps to provide additional accommodation for their rapidly increasing passenger traffic. The intention is to throw a new bridge across the river to the west of the existing bridge, and to erect an addition to the present station on the ground which they have just acquired. From the new station, which would have its principal entrance in Argyle Street, the local traffic would be worked, and a remedy would thus be provided for the congested condition of the existing station. The scheme has already been under the consideration of a Committee of the Town Council, and it is understood that a Bill for carrying it into effect will be brought before next Session of Parliament. Dec: 1898

In the Railway Magazine for September, 1899, was an article, "Through Scotland by the Caledonian Railway," which contained some particulars of the new line under construction by the Caledonian Railway from Connel Ferry to Ballachulish. The bridge across Lock Etive, on this extension of the Callander and Oban Railway, will have a clear span of 500ft., and will form the second longest clear span railway bridge in Europe, the Forth Bridge taking precedence. The design adopted is that known as the cantilever, as in the case of the Forth Bridge. The elevation of each cantilever is formed of three main members composing a large triangle—a horizontal rail-bearing member extending over the waterway, and braced in connection with a fifth member or tie, from the apex of the large triangle. Resting between the extremities of these two arms, which project towards one another from either side of the channel, is a girder span of 232ft. The whole weight of the bridge and its load is carried at the lower points of the large triangle, which rests on granite piers, and to meet the tendency to tilt seawards about these points the landward arms of the cantilevers are anchored down to the masonry piers which form the ends of the arching or approach viaduct. The entire superstructure will be of steel. An access for foot passengers is provided across the bridge, and the clear height above ordinary high tide will be 50ft.

May 1901

The Caledonian Railway is about to reconstruct part of its system on the south side of the river Clyde, between Eglinton Street and Gushetfaulds, Glasgow. A second tunnel is to be constructed at Eglinton Street to facilitate the working of the traffic at this point. The bridge which spans Gushetfaulds station is to be removed and replaced by a modern and larger construction of steel. Gushetfaulds station is to be abolished. At this point the railway forms a narrow neck, and although there are 13 lines over the Clyde bridge, there are only two at this point available for the traffic to and from the east, the south of Scotland, and England. The scheme keeps in view the necessity for providing additional lines to the south. Meanwhile two additional lines of rails will be laid. The existing station at Eglinton Street is to be remodelled to some extent. The span of the old bridge in Cathcart Road is 45 ft., and the new bridge is required by the corporation to be wider. The old bridge is to be replaced by a steel structure, and steel piers will replace the stone abutments.

* * *

1907

The Caledonian Railway is about to take in hand the widening of the superstructures of the over-bridge on the Motherwell deviation line at 89 miles 27 chains, and the over-bridge on the Wishaw and Coltness line at 89 miles 27 chains, as well as the renewal of the under-bridges on the Greenock line at 115 miles 41¼ chains, the Rutherglen and Coatbridge branch at 6 miles 8 chains, the Wishaw deviation line at 87 miles 47 chains, and the over-bridge on the London Road branch at 56 chains. Other contemplated renewals include the superstructures of the under-bridges at 34 miles (south of Wamphroy station) on the main line, and at 17 miles 22 chains (east of Addiewell station) on the Cleland and Mid-Calder branch.

* * *

Dec: 1907

The Caledonian Railway is to erect a new engine shed at St. Rollox at a cost of £6,200, and to expend £3,500 on the reconstruction of Gleneagles station.

* * *

RTM Feb: 1919

1901
May

FIVE MINUTES AT FERRYHILL JUNCTION WITH OUR LATE QUEEN.

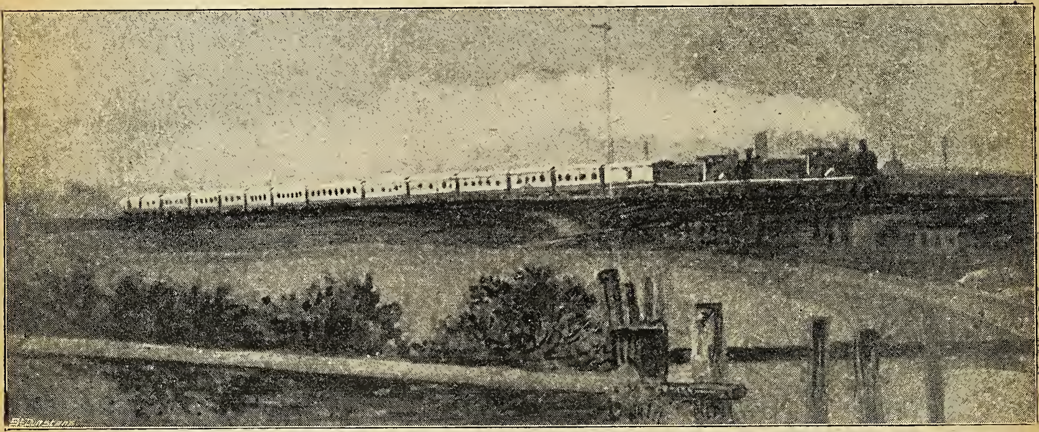
By "Saint Mungo."

THE title of this article represents the delightfully unique treat enjoyed a few months ago by the writer, a mere plebeian.

The occasion wasn't exactly a *tête-a-tête*, that would have been much too embarrassing, nor was it a stiff, formal, awe-inspiring presentation, but a regular downright friendly and enjoyable affair, sufficiently interesting to recount and to remember for a lifetime.

It happened in this way. The Queen, as has been her inflexible custom during the past fifty-one years, pays two visits annually to her Highland home at Balmoral. She is specially fond of spending her birthday there, and times her arrival a day or two before the 24th of May, and her departure South about a month later. Notice from the Court had, as usual, been sent to the four interested railways, intimating that Her Majesty was to return South, as per the elaborate special time-table, and already the empty carriages composing the Royal train had lumbered right through the heart of England and down to the Scottish Grampians in readiness to receive the precious freight.

At all stopping places *en route* when the Queen travels the public are rigidly excluded, except at one particular point—namely, the city of Aberdeen—which, for some untranspired reason, has always, as it were, basked in the Monarch's favour—at least, in that respect.

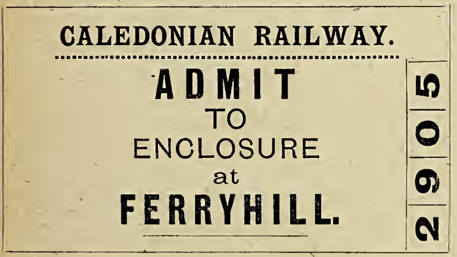


HER LATE MAJESTY'S LAST JOURNEY FROM BALLATER.
The Royal Train on the Deeside Branch of the Great North of Scotland Railway.

To be a privileged spectator when Her Majesty passes North or South does not fall to everyone's lot, but for once this seeming difficulty effectually vanished on the utterance of the open sesame—"Railway Magazine Correspondent"—and the special permit (illustrated below readily granted to "Saint Mungo" gave the writer the opportuity of spending the five minutes with our late Queen.

The Royal train, however, doesn't really enter the Granite City, it merely skirts the municipal boundary in its brief and necessary halt at the junction where the two Scotch lines meet. And such an unconventional spot for so auspicious an event. Its name is Ferryhill, and in the ordinary course of business it is utilised for the distinctly commonplace operations connected with the transit of cattle and dead-meat traffic; many of the prime carcases that reach Smithfield on the right side of Christmas starting on their final railway journey from here.

Five twenty-two p.m. is the precise schedule time for the arrival of the Queen, and already, some two hours in advance, numbers of well-dressed people are beginning to gather for the *al fresco* function. This certainly means a lengthy wait, but subsequent events prove abundantly compensating.



CALEDONIAN RAILWAY.

ADMIT
TO
ENCLOSURE
at
FERRYHILL.

2905

At five o'clock *to a tick* dashes down the Deeside line a solitary Great North of Scotland railway engine, with *nemo me impune lacessit* written plainly on its haughty stride. And no wonder! It is the Royal pilot—*i.e.*, an ordinary locomotive that sets out twenty minutes in advance of the Queen for the important purpose of clearing the way ahead. It carries a driver, fireman, and two or three leading officials, and thinks the load an insignificantly paltry one.

Forthwith the Caledonian Railway pilot hurries away to prepare the course as far as the English border city of Carlisle, beyond which the same precautionary measure is successively undertaken by the London and North-Western and Great Western pilots over the respective systems.

The crowd grows apace. Six, seven, eight hundred, and still increasing. Ladies, gaily costumed, preponderate. White-gloved constables stalk leisurely around; railway inspectors and important officials chat in bevies; the town and county gentry, clergymen, and University professors give welcome tone, which is further enhanced by the City Fathers decked in full robes and regalia of office.

A neighbouring signal-arm falls—a simple enough incident at ordinary times, but full of deepest moment now. Five twenty-one, says my chronometer, and in one tiny minute should arrive the First Lady of the Land—nay, much more, the beloved Sovereign and sympathetic friend of her people.

A loud hum of ill-suppressed excitement arises, and everyone looks fixedly, as if fascinated, at the drooping signal. We are all on the tip-toe of pleasurable expectation.

Suddenly round a sharp bend in the track appears the two resplendent locomotives, and then the whole train—no fewer than fourteen vehicles all told—which glides in with stately grandeur, and ere the wheels have ceased to revolve a cluster of ladies beside me spontaneously lead off with the National Anthem; and all along the line the spectators swell the strain with infectious fervour, the soprano voices conspicuously dominating the others.

The appearance of Her Majesty seated at the saloon window near the middle of the train leads to wild waving of hats, parasols, Union Jacks, bannerettes and handkerchiefs, each of us striving to outshine his neighbour in enthusiasm. There is renewed singing of "God Save the Queen." Each loyal outburst on our part unfailingly elicits the same kindly smile and bow from the Sovereign, who seems to heartily appreciate our enthusiastic homage.

A pretentious bundle of documents is handed into the Royal saloon, and from amongst them Princess Victoria of Schleswig-Holstein singles out one or two and reads them to her august relative. For some succeeding seconds Her Majesty is lost to view, and so we transfer our attention to the other travellers. Amongst them we easily recognise the familiar and well-nigh indispensable figures of Sir Arthur Bigge, General Clarke, Colonel A. Davidson, and Sir James Reid; the others embracing ladies-in-waiting, upper servants, ladies' maids, Queen's dressers, pages, etc., as also a number of Royal and distinguished guests. The picturesquely-attired Indian attendants and the stalwart and kilted Scotch retainers throw a little colour and romance into the well-ordered bustle caused by the exchange of mail-bags, innumerable despatches, and so forth.

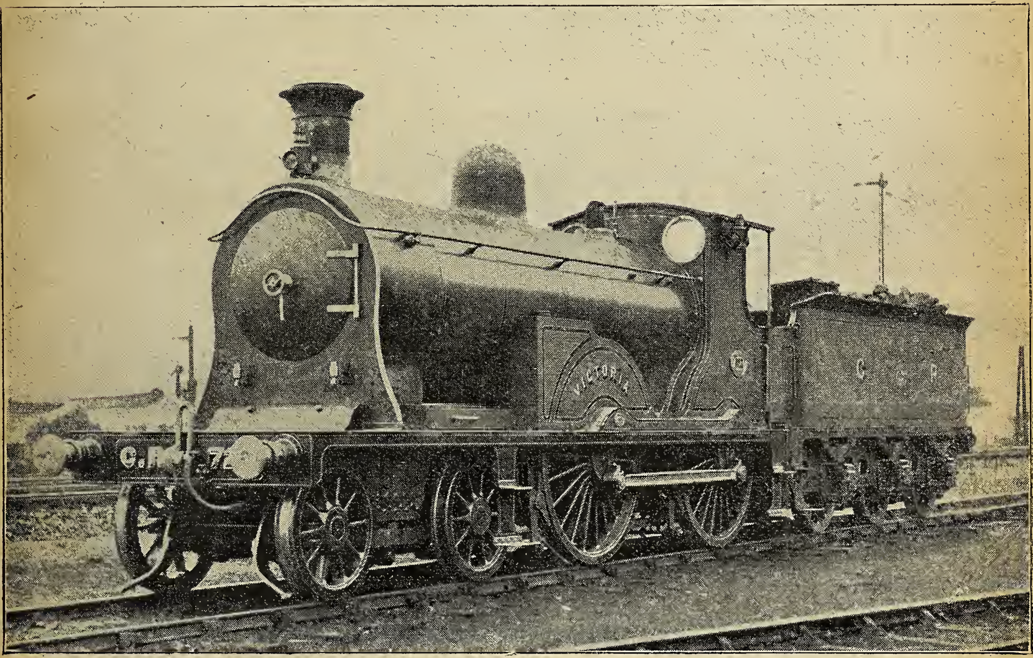
THE ROYAL TRAIN WAITING FOR THE TEA-KETTLES AT FERRYHILL JUNCTION.

Just then the Queen returns to her seat by the window, and continues to acknowledge our lusty and persistent greetings; not, indeed, with the State article I have often seen her dispense elsewhere, but with the loving smile she reserves for personal friends. We are within about a couple of yards of the Royal saloon, and can see the depth of feeling for ourselves.

There is a brief, marked pause. What are we waiting for now? And at the last moment a railway employee enters on the scene bearing two large domestic black kitchen kettles of boiling water, which he carefully hands into the train—for the Royal *five o'clock*, it is whispered, and this in spite of all modern conveniences being on board. But the Queen's liking for so-called old-fashioned usages is proverbial. This, then, is the traditional last man!

The signal for the road Southwards immediately falls with a pompous jerk, and then it is that a queer thing is apparent. The train had certainly never moved during its stay, and yet what was formerly the front is now the rear, and *vice versâ*. The Great North of Scotland engines had in the interval been silently detached from the one end, and at the other the two 94-ton (sprinters) of the Caledonian Railway's famed "Dunalastair" No. 3 type had, as noiselessly and unostentatiously, been attached.

By this time the Great North of Scotland officials who accompanied the train to the limit of their territory had detrained and given place to those of the Caledonian Railway. The latter embraces directors, the superintendent of the line, the chief mechanical engineer, the civil engineer, and the telegraph superintendent, as well as some minor lights composing the staff of expert telegraph and engineering artisans for attending to the vehicles *en route*, and, if need be, dealing with contingencies and establishing electric communication at any desired point on the journey.



No. 723, THE CALEDONIAN RAILWAY LOCOMOTIVE THAT DREW THE ROYAL TRAIN.
Named "Victoria" after her late Majesty.

The spokesman of the Royal party now makes it known that the journey may be resumed. The chief official in charge of the train thereupon, and after satisfying himself that its examination is completed, passes the information verbally to the front guard, who then exchanges signals with the rear conductor, and after receiving intimation from the official in charge of the station that all the members of the Royal party are seated, and that all is right for the train to proceed, waves his little toy green flag.

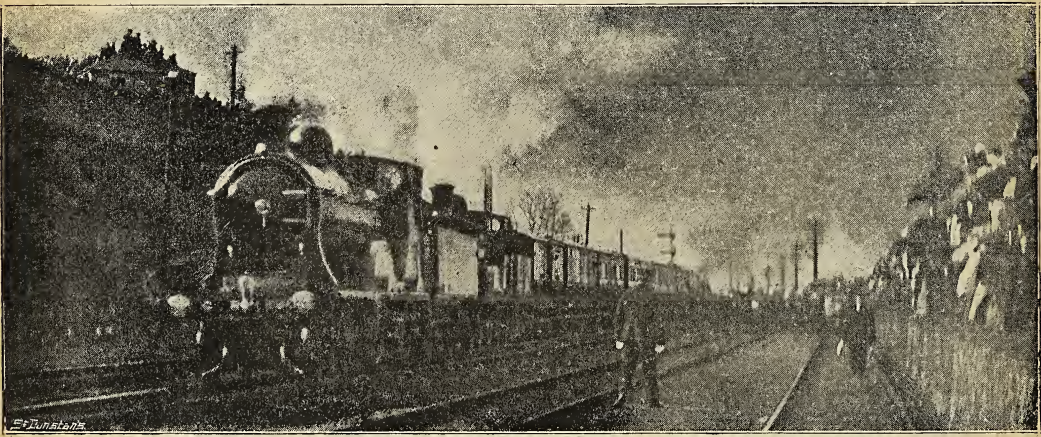
The minute hand has reached twenty-seven. The two carefully - selected drivers simultaneously give their steam regulator handles the magic turn. The train creeps gently into motion, and on the initiative of the city magistrates we emit a series of deafening cheers and wild gesticulations; a French lady at my elbow magnanimously contributing a spirited "*vive Victoria.*"

The Queen seems more pleased than ever at this the climax of our feelings, and many of the Royal party lean out of their carriage doors for a spun-out enjoyment of the enthusiastic send-off.

At the risk of being pounced on as an Anarchist with evil intent I circumspectly operate my camera, and snap a hurried picture of the departing train and demonstrative onlookers, to subsequently find with delight the result to be a charming photographic memento of the occasion, and a twin relic to my admission card, which, by the application of journalistic persuasion, I was permitted to carry away.

The puffs of smoke and steam emerge from the two capacious funnels with ever-increasing rapidity and volume, and the train glides out of sight across the picturesque Dee Bridge.

The serenely benign gaze in which we have been basking lingers fondly on the retina, but this, of course, is a mere fancy. The show is ended. The delighted gathering, whose flow of conversation had been voluntarily held in abeyance, now wipes off all arrears. Each congratulates the other on his or her good fortune at being present; recounts each phase of the entertainment; criticises the dress and features of the departed *voyageurs;* remarks on the wonderful effect the Highland air has had on the Queen's appearance; and then we discover amongst our number the presence of a wedding party, resplendent in gay plumage and bouquets, who had joined the merry crowd somewhat late as a happy wind-up of the nuptial festivities.



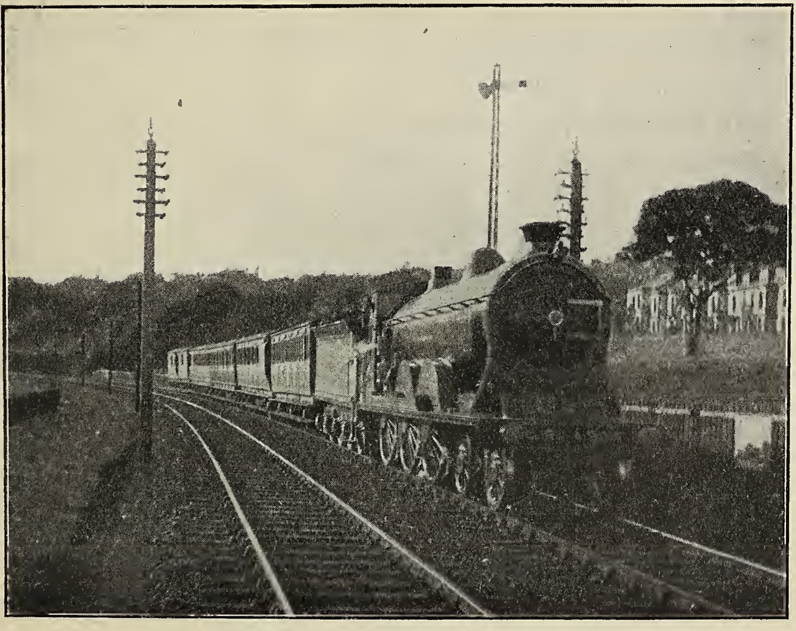
THE ROYAL TRAIN LEAVING FERRYHILL JUNCTION FOR THE SOUTH.
Drawn by two Caledonian Railway Locomotives.

The railwaymen left behind seem mightily pleased at the happy termination of their duties. Evidently they breathe more freely after the period of high tension just ended, and quickly set about restoring things to their normal condition. There is, however, sufficient time in which to do the work, because no train or engine dare follow in the same direction until the expiry of the regulation time-limit of fifteen minutes. Danger to the Royal craft from behind is thus as unlikely as in front, seeing that no vehicle of any sort (except the Royal pilot already noticed) can enter upon or cross the Royal route at any point for at least thirty minutes before the Queen's train is timed to pass. As for passing dangers there is little risk, since passenger trains alone can run on the opposite line of rails, and then only at the reduced speed of ten miles an hour while passing Her Majesty.

"It's a big business, and there's a great load off our minds when she's gone," confided a friendly railwayman. "On occasions like this we all feel that our loyalty and our jobs are at stake, for the least avoidable hitch in connection with the Queen's comings and goings would undoubtedly mar the future career of the delinquent. And she gets at a jolly good bargain, what the greatest millionaire could not command. Three shillings and ninepence per mile, in addition to ordinary first-class fares for the members of the suite, is understood to be the rate; or £110 for the 589-mile spin, which is made up of 42 miles on the Great North of Scotland Railway, 241 on the Caledonian Railway, 181 on the London and North-Western Railway, and 125 on the Great Western Railway. Every yard of the road is patrolled by an army of alert surfacemen equipped with hand and detonating signals; all facing and depot points are securely bolted down for the time being; and responsible officials zealously guard all the bridges to be passed. She commenced her railway journey at 4.12 p.m.," he continued, "and will finish it on arrival at Windsor at 8.45 a.m.; which, with stops for changing and watering locomotives, occupying in all 62 minutes, gives the actual running speed of 38 miles an hour. Beyond or under that pace the Queen long ago commanded that she does not want to travel, and the carefully-compiled time-table secures the accomplishment of her wishes."

Her Majesty, it seems (in 1864), became greatly alarmed by the spate of accidents, and caused the directors of the various railways to be written, urging them to carefully consider every means of guarding against those misfortunes, and expressing the hope that the same security so carefully provided for herself be ensured for the very humblest of her subjects. But it can't be done. The wide-spread dislocation of traffic that follows the blocking of one of the country's main highways of commerce is a stiff price to pay, even for a display of loyalty. The great inconvenience is, nevertheless, ungrudgingly borne alike by the railways and the community.

But the train has really been gone some little time, the spectators also have melted away, all but a solitary one; and I, too, take leave of the unpretending spot where the same deliciously homely and touching scene had so often been witnessed during the glorious Victorian reign.



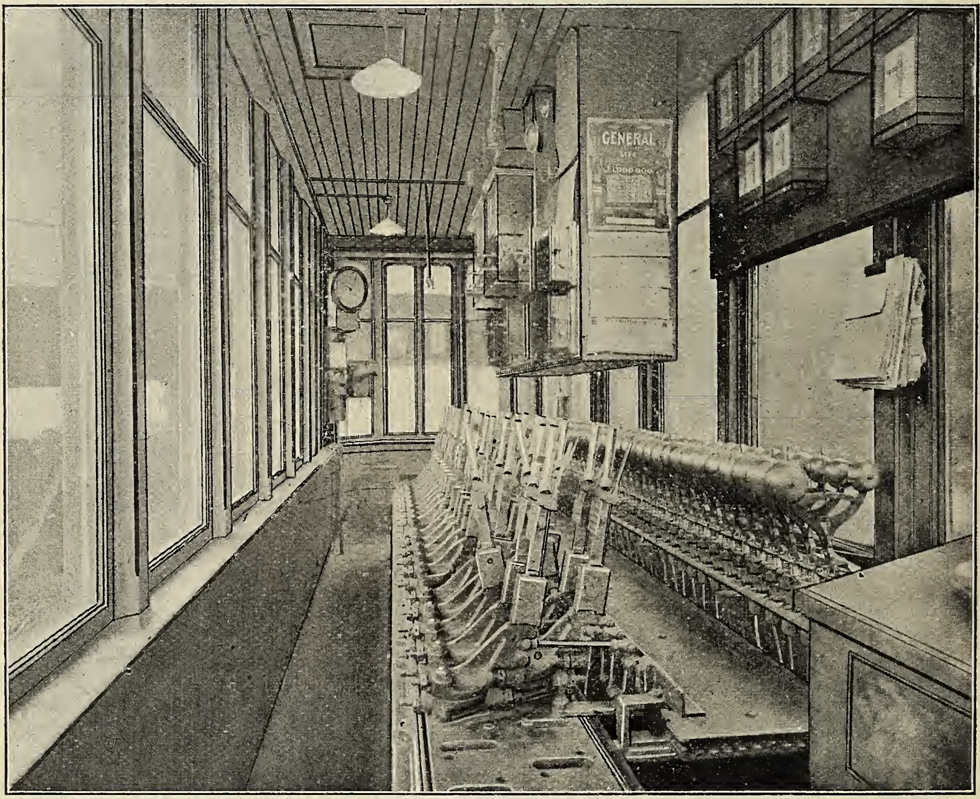
Photo] CALEDONIAN RAILWAY. [*Mr. Tom M. L. Neish.*

Down train passing Buckingham Junction, drawn by 4-6-0 locomotive No. 903.

Signalmen and their Duties.

By E. B. Hutchinson.

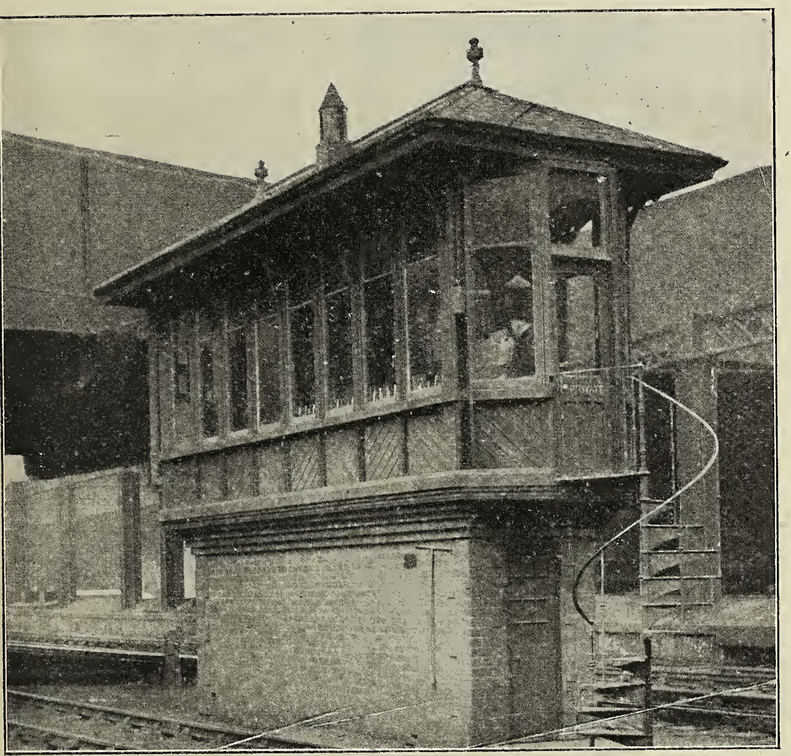
SOME years ago I remember a discussion arising on the relative responsibilities of signalmen and engine-drivers. Such a debate is, of course, quite beside the point; as any attempt at comparison between the two is ridiculous, for each reigns supreme in his own sphere. There can be no question, however, that the signalman's calling is one of the most important and responsible in the whole railway service.



INTERIOR OF STOB CROSS SIGNAL BOX.
Showing the levers of the hydraulically-operated apparatus.

Signalmen are carefully selected in the first instance after a thorough training, and when once they have been placed in charge of a signal-box the most minute care is exercised to keep them up to the mark and see that they carry out all the rules and instructions, the strict observance of which are so necessary to ensure freedom from mishap. It might be thought that these precautions are carried too far, but the end in view, absolute safety, amply justifies the means taken to secure it. Some of the cleverest brains and acutest intellects in the railway world are continuously at work evolving apparatus and working regulations designed to secure an even greater degree of safety than that which now distinguishes our British railways, if this is possible. This being so, the mention of some phases in the life of a signalman may prove of interest to readers of the Railway and Travel Monthly. I also propose very briefly to go over a few of the precautionary measures taken by the Officers responsible for this important department on an average British railway. The Caledonian, in this instance, will serve for the purpose of illustration.

There is always so much to see, not to speak of to do, and so many things to learn in a signal-box that the study of this branch of the service should particularly appeal to all students of railway working. In my own case I must confess to many an afternoon and evening very pleasantly spent listening to the gossip of the men, the ringing of the bells, and the clash of the levers as they were pulled off for passing trains. Even yet, after having the usual illusions regarding railway life dispelled, and having had practical training in the duties and insight into the life of a signalman, the glamour still retains much of its strength; the signal-box, although robbed of its mystery, will always remain one of the most interesting features of that stupendous organization termed the railway.



EXTERIOR OF THE STOB CROSS SIGNAL BOX.
The installation here is operated by hydraulic power.

The general public, and I am afraid a proportion of railway servants, seem to have very little knowledge either of signal-boxes or the men who work them. The casual interest displayed by the passer-by, and the well-meant explanations made by the signalman, almost invariably lead the seeker after information into utter confusion. He probably goes away little wiser than when he came. From this it is reasonable to deduce that there *is* something to learn in a signal-box and that that something is not very simple. The fact that the railways of Great Britain employ some thousands of signalmen, by no means drawn from what are styled the "educated" classes, who have mastered the intricacies of "Block Rules" and many other rules, reflects no small amount of credit upon the capacity of the British working man. Indeed the intelligence necessary for a proper grasp of the subject is by no means universal, for many a man is unable to pass the rigid examination required of him before appointment. But a signalman is not made by rules alone. He must be suitable in various other ways. He must (in most cases) be able to telegraph. He must have good eyesight, and not be colour-blind. He must, above all things, be smart and observant and have plenty of presence of mind for emergencies. At all times he is expected to act with discretion and by means of judicious arrangements get the traffic along the "road" as quickly as possible.

A signalman is not placed in his box merely to see that the traffic is worked safely. He is also responsible for seeing it worked to the best advantage and with the least possible delay.

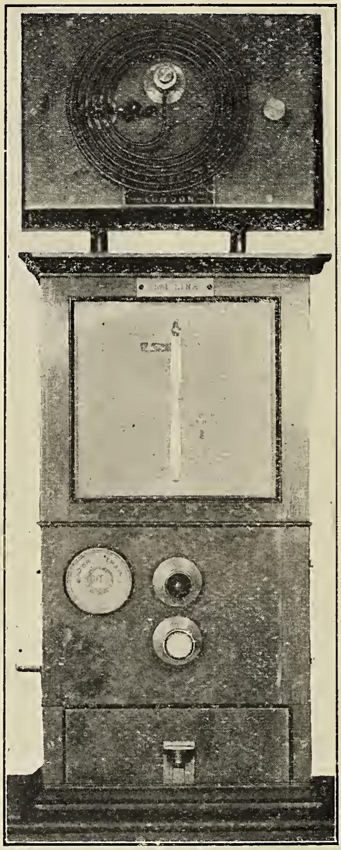
A paragon of virtues is not often found even in story books; so also in this case we have to make the best of men who possess only some of them. But it must be admitted that signalmen, on the whole, are an exceptionally intelligent class; suffering like other men. from occasional lapses of mind, but, where well trained and well managed, giving little reason for complaint.

Starting his official life very probably as a boy porter, telegraph, or telephone lad, the embryo in time, under good supervision, becomes acquainted with the working of the signal-box. From now onward his career is assured; in time he will be admitted into the select ranks of those men, to whose unremitting care and ceaseless vigilance so many human lives are entrusted.

First of all, however, before he is considered suitable to take charge of a box, he must display a suitable knowledge of the working and rules.

He must know the 38 Block Rules, including the code of rings for signalling trains, and be able to work the block instrument correctly.

He must also know as many of the Rules in the Company's Standard Rule Book as apply to his calling. These include the special instructions issued in connection with foggy weather, and for working traffic over a single line of rails, when one of the two lines of rails is blocked on account of accident, or for any other reason; besides rules dealing with many other things. In addition to these, there are many special instructions contained in the Company's Appendix to the Rule Book, engine headlights, etc., etc., with which it is necessary for a signalman to be thoroughly conversant. Having shown himself to the District Inspector as having a satisfactory knowledge of these matters, and then, having personally been certified by the District Traffic Officer, the recruit will very likely be appointed "porter signalman." That is to say, he will have charge of a signal-box for perhaps four hours a day, after the ordinary signalman has finished duty, but will put in the rest of his time as porter. In this way his theoretical knowledge will be supplemented by practical experience.



MODERN BLOCK SIGNALLING INSTRUMENT, CALEDONIAN RAILWAY.

It is easy enough to work a signal-box or to give a hand at any sudden pressure, while the real signalman is present to see that everything goes on all right, but a very much stronger sense of responsibility comes over one when left solely in charge for the first time, and responsible for the safe and efficient working of the traffic. A little practice, however, soon removes all trace of nervousness, and in a short time the man smokes his pipe equally peaceably in or out of a signal-box.

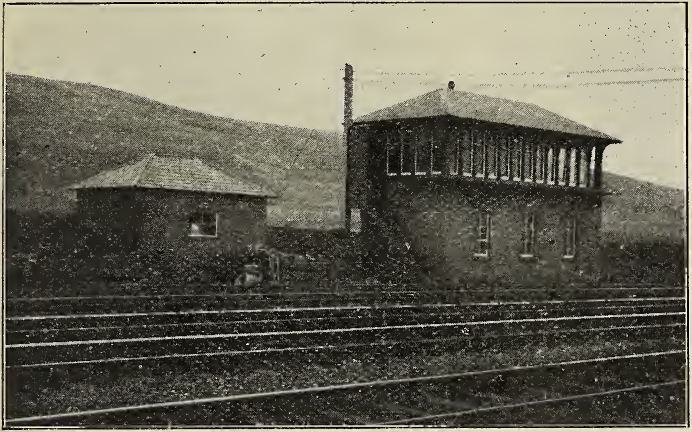
Having by this means become acquainted with the theoretical and practical working, it will not be long before a vacancy in the regular staff will be found, at a small box at first, and later at larger and more important ones.

On the Caledonian Railway the signal-boxes are graded into a number of classes, according to the number of lever movements, and it is always the signalman's ambition to get promoted to a box in the next higher class. In changes of this kind so careful are the management, that before taking up duty in a fresh box the new man must be certified to be able to work the box efficiently by the previous signalman as well as by the District Traffic Inspector.

The latter men, by the way, hold an

important position in connection with signal-box working. For instance, in the stretch of line allotted to them they are held responsible for the punctual, safe, and correct working of the traffic, and for the proficiency of the signalmen in their work. They are also required once a year to certify for the satisfactory knowledge of the rules of every signalman in their section. Beyond this, every twelve months the District Officer is expected to personally examine the men. By these means the men are kept very thoroughly up to the mark, and any who are inefficient are speedily brought to light.

But not content with so carefully training and keeping the men in a state of efficiency, the Company safeguard them against mistakes by other means, special regulations and ingenious electrical and mechanical apparatus. For instance, so far as the actual manual labour of the box is concerned, the signalman is relieved from chance of errors by the marvellous ingenuity of the interlocking, fouling bars, locking bars, facing point detectors and many other similar clever contrivances.



BEATTOCK SUMMIT SIGNAL BOX.
The signal box most frequently mentioned in popular railway literature.

It is hardly necessary to mention what an important part the interlocking plays in a signal-box. It is very commonly known how it protects the signalman against himself—he cannot if he would cause a derailment or a collision by pulling off conflicting signals and points.

All these precautions, however, would not prevent two trains from colliding if the one overtook the other on the same set of rails, the signals being duly "off" for both. Here comes in the safeguard of the block system, which ensures that only a single train can be in any section of line between two signal-boxes at once.

The root idea of the system is extremely simple and can be grasped by a child. At first it was put into operation merely by a few code rings on electric bells fixed between adjoining signal-boxes, with the addition of a telegraph needle, which was blocked over when the section was occupied. Hence the now universal name "Block System." But as the years sped special block instruments were installed, and it was found necessary to tack on to the original block code and rules quite a number of other matters, principally concerning the action to be taken in case of emergency, so that at the present day no less than 41 different bell codes, and 38 rules (with numerous subsections concerning their use) are in operation.

The electric instruments by which the trains are signalled and safeguarded in accordance with the block system are usually placed directly over the levers to which they refer.

It is perhaps hardly desirable to give a description of any one type of instrument, as each railway usually has its own; nor should it be necessary to mention the procedure between the boxes in signalling a train, as this can be seen at any station in the Kingdom.

Single lines are worked either by means of staff and ticket, by the electric tablet apparatus, or by the electric train staff. Originally several forms of tablet instruments were in use, but these are now all being replaced, so far as the Caledonian Railway is concerned, by more modern instruments which allow a tablet, removed for shunting or other purposes, to be replaced in the same instrument.

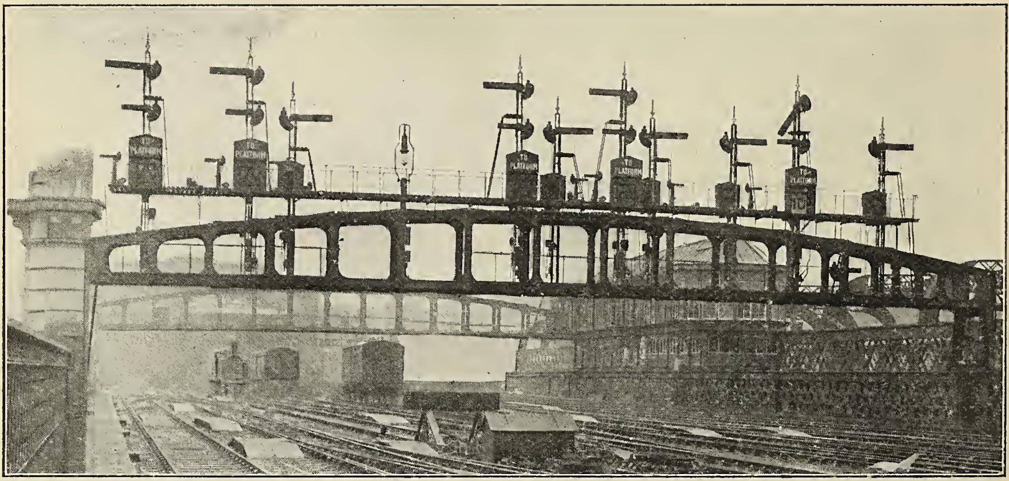
I have mentioned how the signalmen are safeguarded by such means as interlocking, etc., in the purely manual labour of the box. In this part of their work also every precaution is taken by the authorities to secure them from mistaking or misreading the electric bell signals. The

BENDERLOCH.

A typical Caledonian Railway single line station in the West Highlands.

policy pursued in the Standard R.C.H. code, which is adopted by practically all railways with such modifications as may suit local conditions, is to make, as far as possible, two men responsible for each signal given or received. This is done by causing nearly every bell signal received to be repeated to the sender, should this not be done correctly the signal must be given again until the other man repeats it properly. In the same way on single lines the signalman at each end of the section must concur before a tablet can be taken out of the instruments. In some cases, such as with the "Train entering section" signal, it is not found necessary to repeat the two rings, as the reply is given by altering the position of the needle, or whatever may be its equivalent in the block instruments in use.

In the acceptance of trains, also, instead of repeating the bell beats, as on some railways, it is considered on the Caledonian Railway preferable to have a single code by which all trains are accepted. This short and simple code ring (1*—2) saves a great deal of ringing in busy boxes, and seems better in many ways than the practice



SIGNAL BRIDGE AT GLASGOW CENTRAL STATION.

These signals are operated by the Electro-Pneumatic System of the McKenzie, Holland & Westinghouse Power Signal Co., Ltd.

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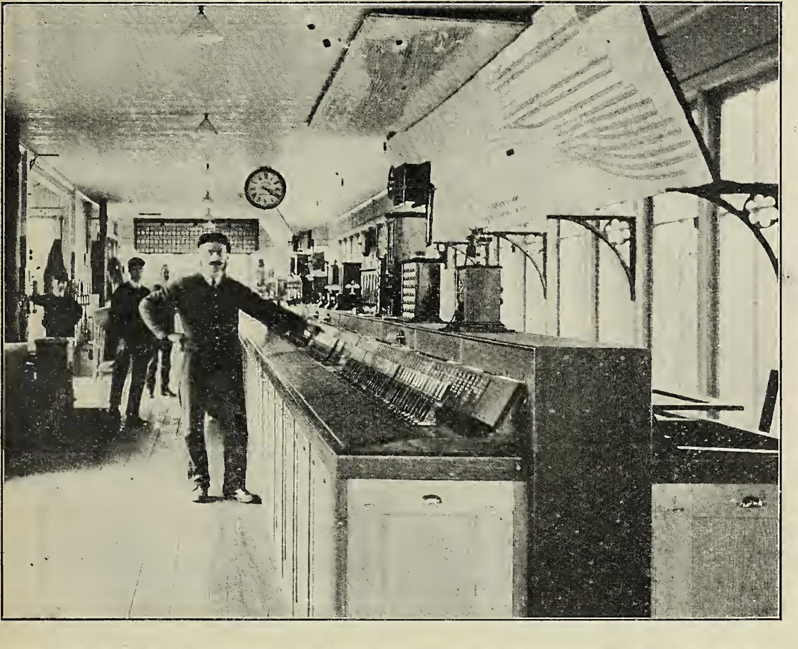
* The — means a pause. The figures read 'one, pause, two.'

adopted by other railways of repeating for acceptance. On single lines on the Caledonian Railway, however, the Standard R.C.H. practice of accepting by repeating is adhered to.

Previous to 1878 great trouble on single lines was occasioned by the delays incident upon working with staff and tickets. Quite often a train had to wait at one end of a section until the staff was conveyed either on foot or horse-back from the other end of the section, perhaps five or six miles distant. In order to prevent serious delay of this kind a number of ideas were put forward. One suggestion was that pneumatic tubes should be fitted between all signal-boxes on single lines, and the staff blown through to whichever end required it.



INTERIOR OF THE ELECTRO-PNEUMATIC SIGNAL-BOX, GLASGOW CENTRAL STATION.
McKenzie, Holland & Westinghouse System.

But the successful solution of the problem was left to an officer of the Caledonian Railway.

It is to Mr. Currer, the late District Superintendent of the Southern and Western Division, that we are indebted for the inception of the method of signalling on single lines known as the "Electric Tablet or Electric Staff" system.

The following is an extract from an article dealing with the invention which appeared in the *Glasgow Herald* of October 11th, 1879:—

NEW SYSTEM OF BLOCK TELEGRAPH.

Within the last few years the Caledonian Railway Company have made two important contributions to the safe working of railway traffic, the first of which was the system of working the Block Telegraph on the affirmative principle, a system which has now proved to be of such an immense advantage and so safe in actual operation that it is being generally adopted by other Railway Companies. The other is quite a new system and especially designed for the safe working of single lines.

Its inception is due to Mr. R. Currer, the District Superintendent of the Caledonian Railway, although the several important features in its details have been worked out by Mr. Edward Tyer, of Goswell Road,* London, a gentleman whose position as an electrician in connection with railway signalling has long been established.

The leading idea involved in the system suggested itself to Mr. Currer in connection with the working of a single line of above fifteen miles in length on the Dumfries and Lockerbie sections, on which the appliance was first successfully put to the test. The system is also in very satisfactory operation on a length of about six miles of single line between Morningside and Newmains, on the Cleland Branch of the Caledonian Railway, where it was carefully inspected a day or two ago by a party of gentlemen, including Mr. P. Thompson and Mr. John Wood, C.E., who came down specially on behalf of the Cockermouth, Keswick and Penrith Railway Company.

The mode of working, as witnessed both at the Newmains and Morningside ends of the section, was exceedingly simple and effective, and was much admired by the practical men present, who discussed every possible condition of things that might arise in the working of the system.

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* Now of Ashwin Street, Dalston, N.E.

The whole of the above-mentioned article was subsequently printed and circulated by Messrs. Tyer & Company.

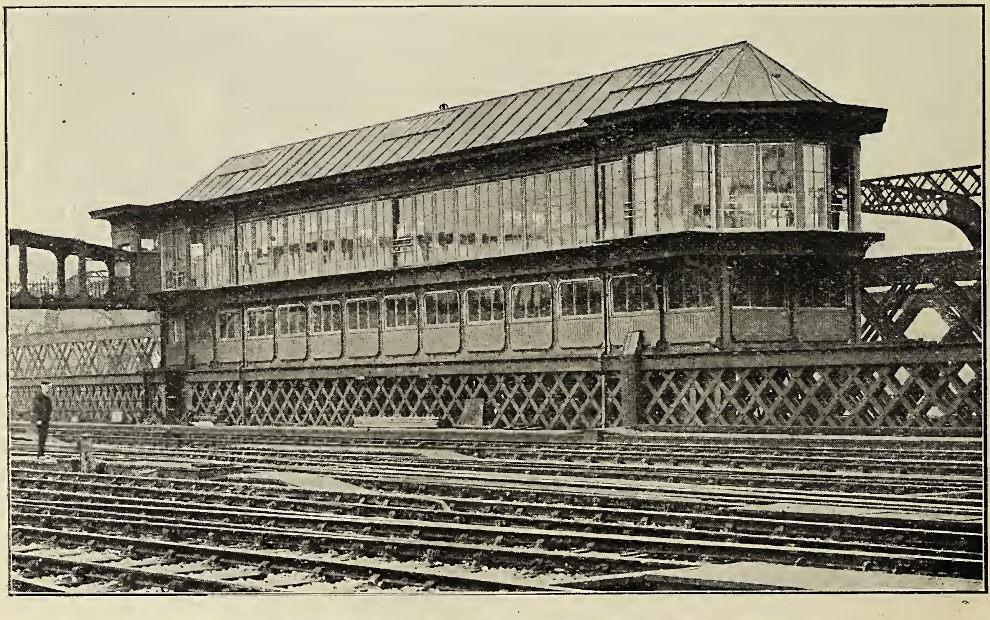
For some months after the installation of the first instruments on the Lockerbie and Dumfries Branch in 1878 they were worked side by side with the old staff and tickets, the latter being the drivers' authority for entering the single line. As soon, however, as the Authorities were satisfied of the reliability of the new electric instruments the others were done away with completely.

The Board of Trade was at first somewhat doubtful of the invention, but finally, after inspection by Colonel Yolland, consented to its use with certain provisoes.

The first instruments, as might be imagined, were somewhat crude. For instance, on some of the first instruments the word "staff" was used although really tablets were in use; the tablets were made of brass, which would easily break if allowed to fall. This latter fault was remedied by substituting gun-metal. With the experience gained a number of improvements were soon incorporated; and instruments made only two years afterwards are in use to-day on the Oban line of the Caledonian Railway.

Other railways, at once realising the immense importance of the invention, immediately installed similar apparatus, and it was soon used on all the more important single lines, both in this country and abroad. The system was also made applicable to work with staffs instead of tablets.

I should like to take this opportunity of drawing particular attention to the fact that it is to Mr. Currer the railway world owes the inception of this now universally used method of working the traffic on single lines (as well as some other innovations of equal importance) the invention subsequently being worked out in conjunction with Mr. Edward Tyer. It is curious, but highly typical of railway life, that the originator of such an important innovation should remain practically unknown and unrewarded.



EXTERIOR OF THE GLASGOW CENTRAL SIGNAL-BOX.

The Installation in this box is worked on the Electro-Pneumatic System of the McKenzie, Holland & Westinghouse Power Signal Co., Ltd.

The railway companies, never content with anything but absolute assurance of safety, are using on double lines in many instances a very ingenious apparatus which still further diminishes chance of error on the part of their men. The Electric Lock and Block system of signalling, invented by Mr. W. R. Sykes,* is so designed that the starting signal is electrically locked and cannot be pulled off until the train has been accepted in the usual way by the signalman in advance. Moreover the starting signal is put to danger automatically without the signalman touching it, by the passage of the train over an electrical contact placed on the line. This contact serves an additional purpose, as the block instrument cannot be placed at "line clear" until the train has passed over the contact and thus left the section clear.

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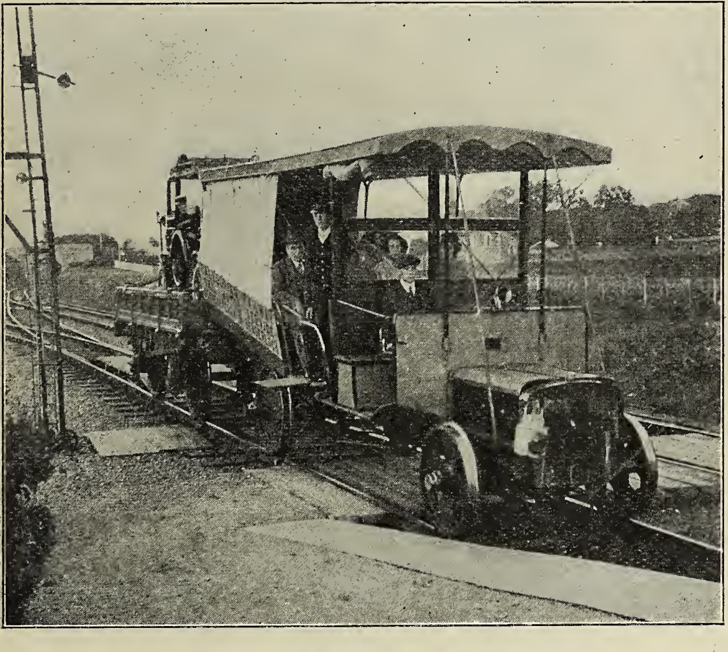
* See *How Railway Travelling was Made Safe*, in the May and June, 1911, issues of the RAILWAY AND TRAVEL MONTHLY.

The signalman, comfortably and warmly housed in all weathers, and protected against errors by all the ingenuity and devices which the human mind can invent, may in ordinary circumstances look forward to a very quiet and uneventful life, but this is occasionally broken by curious interludes. One man was pulling off his signals, when the lever suddenly came over without any warning, throwing him to the floor; a goods train had run off the line at that moment, cutting the signal wires, and thus taking the resistance off them. Another signalman was favoured early one morning with a visit from a wild-looking individual who asked for a shave. As he could not be obliged he disappeared, and was shortly afterwards taken by the keepers of the lunatic asylum from which he had escaped. On another occasion the same signalman was surprised by the entrance of a burly tramp at about 4 a.m. The man proceeded to ask for money with threats. Fortunately the signalman was a big man himself, and having a stout cudgel at hand, soon turned the tables on the man, who departed with more haste than elegance. But these episodes are hardly those desired by the signalmen.



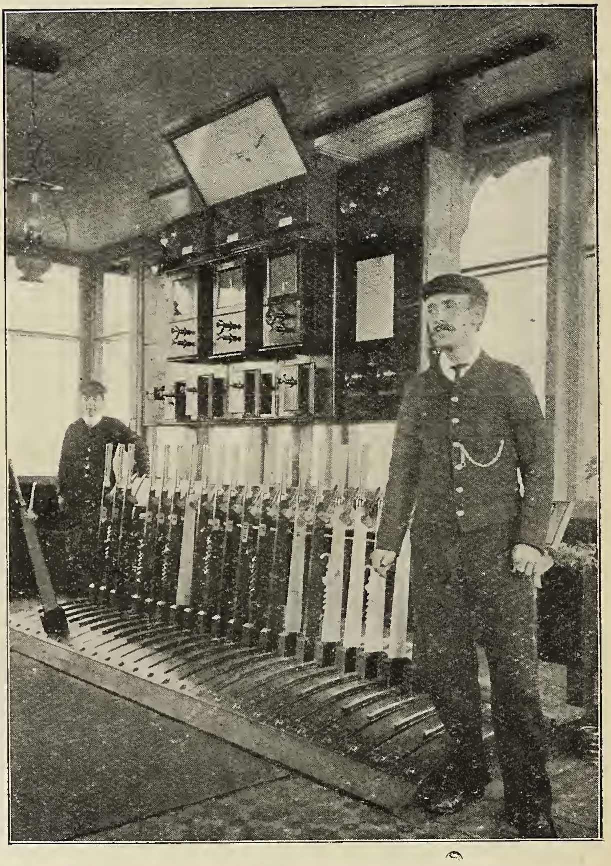
SIGNALLED AS A PASSENGER TRAIN!

A road motor car converted for use on the railway. This car performs a passenger service across the Connel Ferry railway bridge. It has attached to it a railway truck, on which is being conveyed a road motor car.

Many factors contribute to make signalmen—and in company with others the Caledonian—such an intelligent and fine body of men. The responsible nature of their work; the ideal to be aimed at, working the traffic with absolute safety and freedom from delay; complete mastery of the many rules; the seclusion from other men, which allows—in the less busy boxes—time for reading and study, or other pursuits and hobbies; all these things leave their mark on the character of the signalman. The work cannot be done slackly. Promptness and unremitting attention are essential, for bell signals must be answered *at once,* and each time a lever is pulled over it must be ascertained beyond doubt that the signal has answered correctly. The trains have to be watched for signs of anything wrong, and in particular for their tail lamps, in order to see that no vehicles have become detached in the section. I remember receiving a very salutary lesson on this point when learning "the block." The train had passed—presumably intact—and I was just about to give "Train out of section," when the signalman stopped me. Was the train complete? "Well—er—er—*I think so.*"

Then I remembered the tail lamp! The lesson thus given was a lasting one and will not easily be forgotten. A training in the signal-box offers very great advantages to every man. Discipline, a quality needed now, as ever, on the railway, alertness and promptness, both of thought and execution, are some of the things one can hardly avoid learning. The problems which have to be solved by the signalmen are also by no means unworthy of them. Often the moves of the traffic have to be thought out as closely as in a game of chess, but the decision has to be made in a few seconds, and woe to the man who decides wrongly. One sometimes hear people talking of a 'Varsity training for railway officers, but I think that if the undergraduates tried three months of signal-box working they would find the one almost as bad—or shall we say as good—as the other.

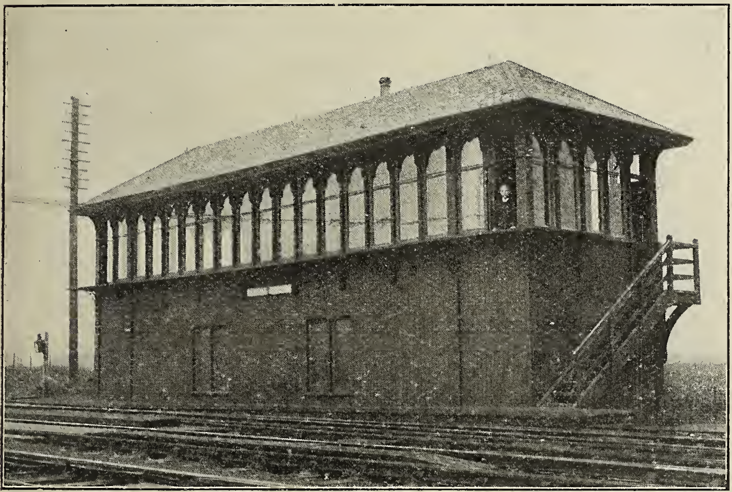
It must not be inferred, however, that signalmen, as a class, are anything like perfect. They have their faults like other men, not to speak of railwaymen, and one of these is a very unfortunate penchant for gossip. The installation of telephones in practically every box has made it so easy to talk, that the rule that "Telephones are not to be used for private conversation" is, I am afraid, almost a dead letter. To such an art has this gossip been raised that I am sorry to say it is currently reported that if Mr. P—(a well-known District Officer) takes off his hat to a lady at C— it is known at the other end of his district before he can get there himself, two or three hours later. The word signal-*box* seems rather out of place at the present day, but it serves to recall the origin of the calling, and of the lowly way in which it started. One is reminded of the derivation from the present day *sentry-box*, to which I daresay the original signal-boxes approximated in size. Certainly the signalman's calling in those days was a very different one to what it is now. Imagine a modern signalman with his head filled with block rules, interlocking, electric bells, telephones and telegraphs, which constitute the modern methods of signalling, going outside his box with a top hat on his head and standing to attention when every train passed, as his predecessors used to do sixty or seventy years ago! In those days the signalman acted very much in the capacity of a policeman, keeping people from evincing too close a personal interest in the railway, like the guardians of the peace do now in our public parks when anyone wishes to have too close an acquaintance with a flower bed. Up to the present day some of our great railways consider their signalmen as belonging to the *Police* Department, and at least one large railway used to supply formidable wooden batons to the men for use in any melée in which they might be engaged.


INTERIOR OF THE WESTBURN JUNCTION SIGNAL-BOX.

Nowadays all this is altered, and it is always an unfailing theme for conversation and debate as to which of the palatial structures, which we still rather strangely term signal-boxes, is the most important on the system.

It is really next to impossible to fix this on the Caledonian Railway from a traffic point of view. "The most important" certainly does not necessarily imply that such a box is large, or deals with the greatest number of trains, and there are so many claimants for this honour that it is difficult to award the palm to any one of them. Glasgow Central is certainly the largest and deals with more trains than any other. But Edinburgh (Princes Street), Perth, Stirling, Shawfield, Rutherglen, Dalmarnock, Newton Steel Works, and many others are both large and very busy, and important boxes.

Among others the signal-box at Lesmahagow Junction is, I feel justified in saying, one of the most important pivots around which Caledonian traffic turns. Yet it is not a large box, only containing fifty levers in use, and is worked by three 8-hour shifts with a man and a boy in each. It was of this box that the late Chief Inspector of the Caledonian Railway remarked a good many years ago that "it would be impossible to work the block system there on account of there being too much traffic!" However, in spite of this, like many another innovation at first condemned by the men, but afterwards found to be all right, the block system has been working very satisfactorily for a number of years.



CARMYLE JUNCTION.
An important Signal-box on the Caledonian Railway.

There are in all some 671 signal-boxes on the Caledonian Railway (including joint-lines), all of which, with the exception of one, are worked by manual labour. These boxes, range from the small one with four levers, to those busier ones with over 100 levers and twenty times the traffic of the former to deal with. The first mentioned will probably be worked by one man with a twelve-hour shift, the box being closed during the night, the latter in 8-hour shifts with two men and a boy on each shift, so great are the diversities of traffic and the variations of men and machinery required to meet them. These 671 boxes are manned by over 1,400 signalmen. There are in all about 8,000 signals. We should not like to estimate the daily number of signal movements.

The signalmen are supervised locally by the Station-masters and also to some extent by the District Traffic Inspectors. These officials are controlled by the District Superintendents, and all are under the supervision of the General Superintendent, or, as he is more usually termed on other railways, the Superintendent of the Line, who is directly responsible to the General Manager and Directors for the safe and efficient working of the line.

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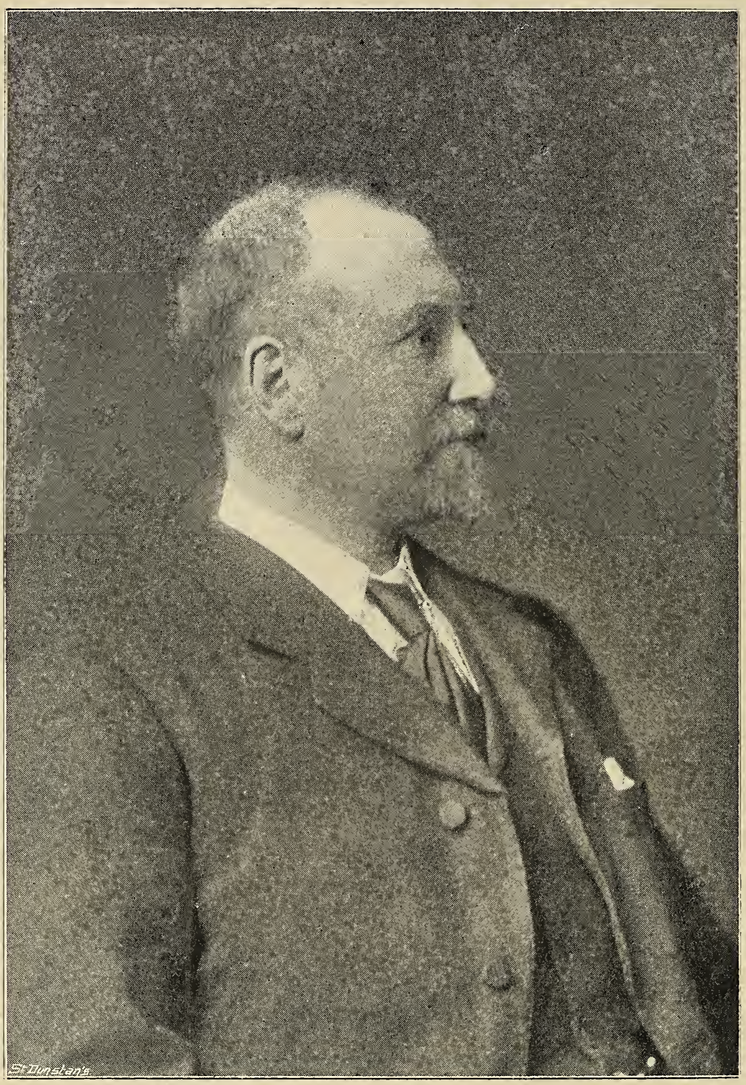

R Millar

General Manager, Caledonian Railway.

Railway Portrait Gallery.

Mr. ROBERT MILLAR, General Manager, Caledonian Railway.

THE portrait that the RAILWAY MAGAZINE reproduces this month is that of the General Manager of the Caledonian Railway. Mr. Robert Millar has occupied the post of interim Manager since the death of Mr. Patrick at the end of last January, but there is all the difference in the world between an interim and an actual managership. In the one case, the occupant of the office is on his trial, in the other he is monarch of all he surveys. Mr. Millar, who has thus been tried and not been found wanting, has been associated with the Caledonian Railway Company for something like eight-and-twenty years. Mr. Millar was born in the historic town of Stirling in 1850. His boyhood was passed at Bannockburn, and he received his early education from his father, who was schoolmaster there. After acquiring a thoroughly sound and practical education, Mr. Millar spent the first five years after leaving school in a solicitor's office in Stirling, where doubtless he acquired those methodical habits which have proved of so great service to him since. The business of the law, however, would seem not to have been to his taste, and he entered commercial life, and was four years engaged in clerical work in Dublin. Returning to Scotland, he was fortunate in securing an appointment with Messrs. Arthur and Co., of Queen Street, Glasgow, among the largest wholesale warehousemen in the United Kingdom. It was in 1873 that he first entered the Caledonian Railway's service at Buchanan Street Goods Station. Railroading found greater favour with him than anything else he had hitherto tried, and the work from the outset has been altogether congenial to him. He remained at Buchanan Street for some two or three years, and acquired valuable experience, as he acted in various capacities. From Buchanan Street Goods Station he was promoted to be Assistant Canvasser in the offices of the Goods Manager, who was then Mr. James, now Sir James, Thompson, the General Manager previous to the appointment of the late Mr. Patrick, and now a director of the company. Mr. Millar's ability again attracted the same favourable attention of his superiors, and in 1879 he was sent to Ireland to be their representative there, his headquarters being in Belfast. In 1889 he was brought back to Glasgow as Chief Traffic Agent or Canvasser for Scotland, and four years ago he was again promoted, his new position on this occasion bringing him into the General Manager's Office, where his alert and intelligent management of the railway's affairs under his immediate control again attracted the favourable notice of the directors. Two years ago he was appointed an officer of the Caledonian Railway under the title of Assistant District Superintendent (unattached). In January of the present year the directors appointed him to succeed Mr. Currer as Superintendent of the Western District, and he was preparing to enter on his duties in this capacity when the untimely death of Mr. Patrick occurred, and the directors appointed him interim General Manager. At the recent half-yearly meeting Mr. Millar was appointed permanent General Manager. For some years to come Mr. Millar will have heavy additions to his other duties in connection with the enlargement of the Central Station now in progress, the practical creation of a new goods station in Parliamentary Road, the rearrangement of the Buchanan Street Station, the construction of a station hotel in Princes Street, Edinburgh, and the extension of the Grangemouth Docks. However, his directors have every confidence in his ability to carry out these several undertakings to a successful issue, and also so to conduct the general affairs of the company as to give every satisfaction to the public on the one hand and the shareholders on the other.

Nov 190

Railway Portrait Gallery.

MR GUY CALTHROP,

General Manager, Caledonian Railway.

THE unexpected decease of Mr. Robert Millar rendered it necessary for the Directors of the Caledonian Railway to make immediate choice of a new General Manager. As our readers know, at the present time Scottish railway affairs are in a state of transition, consequent upon the schemes, *in esse* and *in posse*, for the closer working of the various railways; and this circumstance made the task of the Directors still more difficult.

But with the occasion appears the man, and, fortunately, the Directors had not far to look for an able successor to Mr. Millar, inasmuch as the subject of this sketch—already the Chief Departmental Officer of the Caledonian Railway—was exactly qualified to assume command of the destinies of the vast organisation controlled from Buchanan Street.

A brief glance at the many alterations for the better that have characterised the working of the Superintendent's Department of the Caledonian Railway during the six years Mr. Calthrop has controlled the business of that office, amply indicates the great skill he will bring to bear upon the solution of the varied problems that will confront him in his new position. It is with great pleasure that the Railway Magazine, not only for itself, but also on behalf of its numerous readers, which include Mr. Calthrop's brother officers and *confreres*, most heartily congratulates Mr. Calthrop on his assumption of one of the most important offices in the United Kingdom.

Mr. Calthrop, who is a nephew of Lord Alverstone, the Lord Chief Justice, was born in March, 1870.

When it came to choosing a profession, Mr. Calthrop decided upon entering the railway service, and joining the London and North-Western Railway in 1886, as a cadet on the staff of Mr. Neale, the then Superintendent of the Line, he enjoyed numerous opportunities of obtaining practical acquaintance with the details of his work.

His abilities were soon recognised, and in 1892, he was appointed an outdoor assistant to his chief, and during 1894–5, represented the Superintendent of the Line at Crewe, where he came in close touch with the Locomotive Department. Three years later, Mr Turnbull advanced him to the most important position in his Department—that of Chief Outdoor Assistant to the Superintendent of the Line. In this position, Mr. Calthrop was responsible for the whole of the practical working of the heavy and complex traffic of the London and North-Western Railway, and it was everywhere remarked how efficiently he performed the duties of the office.

Sir Frederick Harrison, the General Manager of the London and North-Western Railway, in 1901 required a personal assistant with ripe experience of the working of that system, and chose Mr. Calthrop for the position. Prior to this advancement, his great grasp of railway affairs was well known in the railway world, and when Mr. Irvine Kempt decided to retire, the Directors of the Caledonian Railway were so fortunate as to induce Mr. Calthrop to leave the London and North-Western Railway and to assume the important position of General Superintendent of the Caledonian Railway.

A perusal of the volumes of the Railway Magazine for the past six years will disclose how cleverly Mr. Calthrop has grappled with the particular problems that have needed solution during that period.

With this record behind him, there is no question that Mr. Calthrop's future will be as successful as his past efforts.

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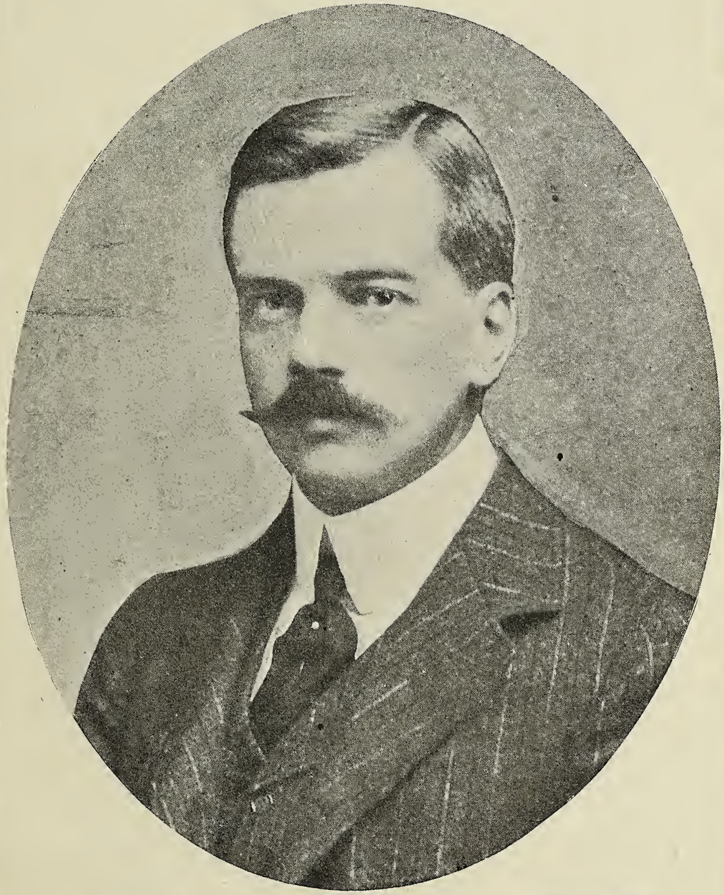


Photo] [*Elliott & Fry.*

MR. GUY CALTHROP,

General Manager, Caledonian Railway.

Sept.

The Caledonian Railway Company:

PRESENTATION TO LADY BINE RENSHAW.

A CEREMONY which is perhaps unique in the history of railways was witnessed in the board room of the Caledonian Railway, when the directors and chief officers presented to Lady Bine Renshaw an excellent portrait of her husband, Sir Charles Bine Renshaw, Bart., the Chairman, as a mark of their sincere appreciation of his long and faithful services to the Company. The citizens of Glasgow and many others would have been only too glad to have had the privilege of contributing to the presentation, but the directors were anxious that the tribute should come solely from those who were in daily association with the revered and popular Chairman, who has held his present office for five years, after having previously served as Deputy Chairman. Sir Charles gives a great deal of his time to the business of the Company, and, as Mr. Donald Matheson, the General Manager, says, " Everyone realises how well he deserves this mark of appreciation of his fellow-directors."

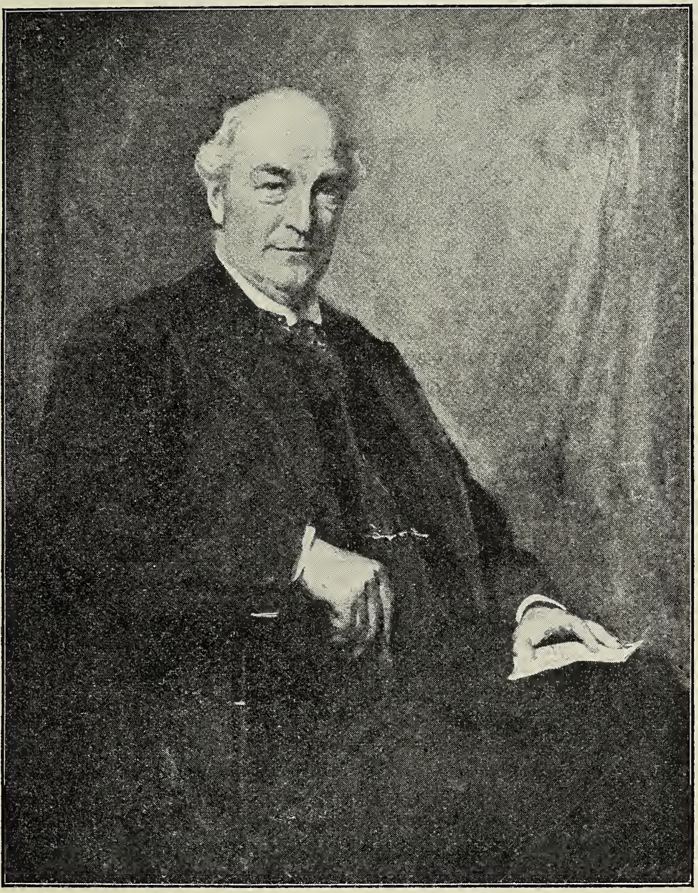
The presentation was made by the Marquess of Breadalbane, K.G., and the large company assembled included the Directors and their wives. Lady Bine Renshaw was accompanied by her daughters, Mrs. Ogilvie and the Misses Renshaw. The Marquess of Breadalbane, addressing Lady Bine Renshaw, said that never was any testimonial more ungrudgingly contributed to than was her husband's picture. It was resolved that it should be a gift entirely from the Board. This resolution was come to on account of the universal popularity of Sir Charles and the difficulty there would have been in drawing a line had they departed from the original proposal to confine the testimonials to themselves. To Sir Charles Renshaw he expressed high appreciation of the manner in which he had for so long filled the honourable position of Chairman of the Company, and the Directors with all the chief officers earnestly hoped that he might long be spared.

Sir Charles Bine Renshaw, in acknowledging the gift, said he did not remember any occasion—excepting perhaps the occasional presence of a lady who had enlightened the proceedings of a deputation in connection, perhaps, with some obscured but interesting subject—on which they had seen ladies in the board room. It was quite true to say that during the last few years in connection with the administration of the Caledonian Railway Company they had had a very uphill battle, but his colleagues and the chief officers had made his task as Chairman a comparatively easy one, because they had all been united in the course that had been taken—a course, which was not altogether one a shareholder looking, perhaps, for an immediate dividend would have desired them to take, but one which in the broad and best interest of the Company it was essential they should take, and they had succeeded in placing the affairs of the Company in a far better position than they had occupied for a long period.

Sir Charles continued: Although I am approaching perilously near the age limit, which places all of us in connection with railway matters on the retired list—if I do vacate the chair I think we can look forward with confidence to my immediate successor seeing the fruition of the work which we have endeavoured to accomplish. Lord Breadalbane, I desire before I resume my seat to thank you and your colleagues for their great kindness to me personally during the term I have occupied the chair and been a member of this Board. I assume that Lord Breadalbane has had sufficient experience in connection with the chairmanship of the Caledonian Railway Company. I think he has been a Director for the long period of 31 years, and during that time he has seen five chairmen of the Company. Sir Charles Renshaw made a generous acknowledgement to the famous artist who had painted his portrait, and as his experience was typical of what often occurs when busy men are compelled to " sit," his tribute may be reproduced.

" But I should like to say " he remarked " that sitting for this portrait as I did, I do not think, ladies and gentlemen, I exaggerate the thing a bit when I say that I do not believe there is any man worse likely to sit for a portrait—sitting still had never been my fort. But Mr. Fiddes Watt has triumphed over the difficulty which he had with his subject, and I should just like, while expressing my gratitude to Mr. Fiddes Watt in connection with my sitting, to pay a tribute to Mrs. Fiddes Watt, for I am pretty sure had it not been for the charm of her companionship and her conversation the portrait would not have been so successful."

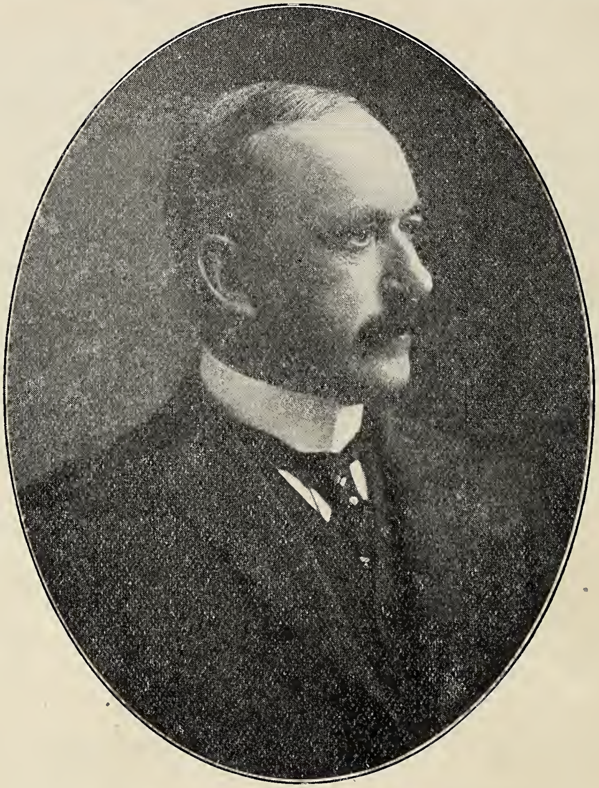
Lady Renshaw added her own brief but earnest appreciation of the extreme kindness of the directors in giving her the portrait, saying that in her heart she was very grateful to Lord Breadalbane for the words he had spoken about her husband, and for the kind way in which he had presented the picture. She thanked every one of the Directors for having shared in the gift. She knew that it had nothing to do with her really, excepting that she was the wife of her husband.



Sir Charles Bine Renshaw, Bart.
Chairman: Caledonian Railway Company.

The above is a reproduction of the portrait painted by Mr. Fiddes Watt and presented by the directors of the Caledonian Railway Company to Lady Bine Renshaw as an expression of their appreciation of Sir Charles Bine Renshaw's services as Director, Deputy Chairman and Chairman of the Caledonian Railway.

The New Engineer of the Caledonian Railway.



MR. W. A. PATERSON, M.Inst.C.E., the recently appointed Engineer-in-Chief of the Caledonian Railway, was born and educated at Perth, and served his apprenticeship with his father, a well-known railway engineer in the North. He afterwards joined the engineering staff of the Northern District of the Caledonian Railway at Perth, where he was engaged in the maintenance of the line and in the construction of many important new works. He was subsequently appointed Engineer of the Perth General Station Joint Committee, for whom he designed and carried out important work in connection with the station at Perth. In 1897 Mr. Paterson was appointed Engineer of the Southern and Eastern District of the Caledonian Railway, which includes the main line from Edinburgh to Carlisle. In this capacity, Mr. Paterson has been responsible for the maintenance of that portion of the line, and during his term of office he has carried out many works of reconstruction in addition to new undertakings. Besides acting as Engineer for the Southern and Eastern District of the Caledonian Railway, Mr. Paterson has acted alternately with the Engineer of the Glasgow and South Western Railway as Engineer of the Portpatrick and Wigtownshire Joint Railways, of which the Caledonian Railway is joint owner.

July 1916

The Man of the Moment.

Mr. Robert Killin, Superintendent of Line, Caledonian Railway.

OUR hearty congratulations are offered to Mr. Robert Killin, whom the directors of the Caledonian Railway have appointed to be Superintendent of the Line, in succession to the late Mr. T. W. Pettigrew. Mr. Killin brings wide experience to aid him in the department of the service he has been called upon to supervise, and the confidence reposed in him by the directors is reflected in their happy decision to appoint him to the important position. His promotion is popular with the staff also, by whom he is held in high regard, and who are also, naturally, pleased that his "commission" has been gained "from the ranks," Mr. Killin having passed through many grades of the railway service.

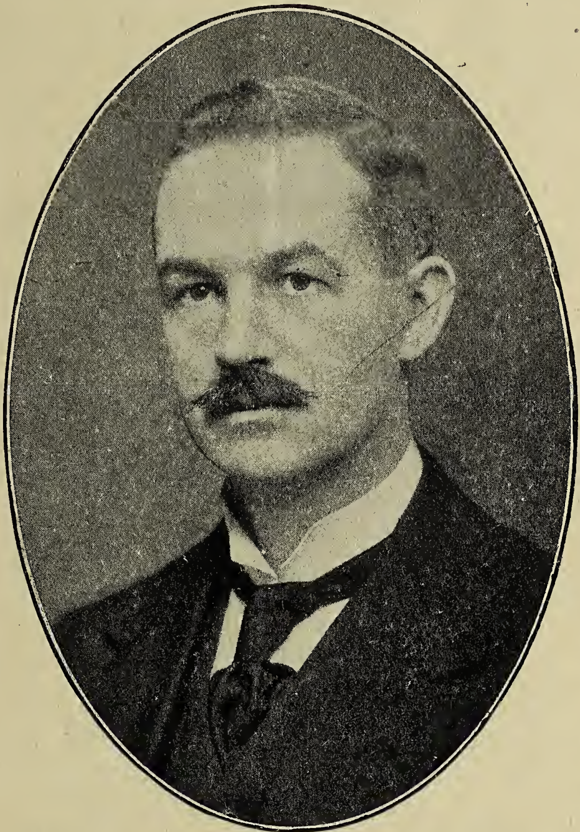


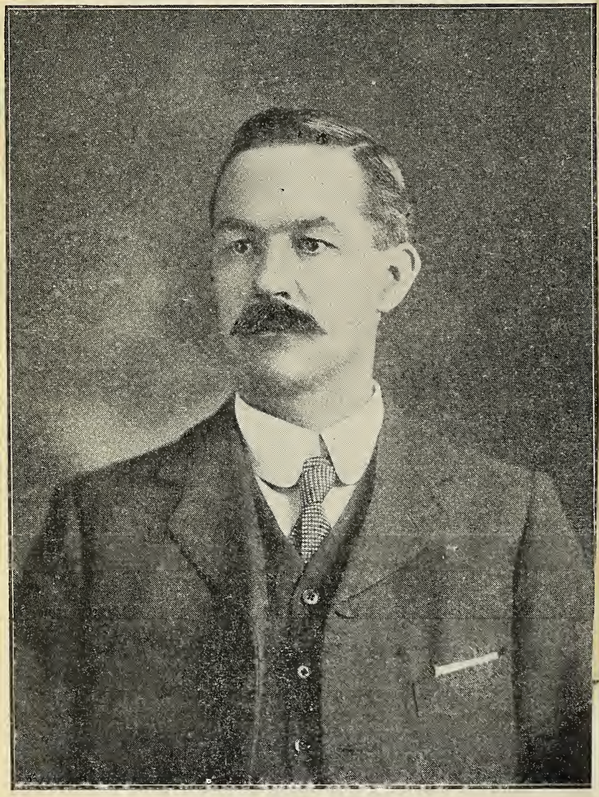
Photo.] [*Elliott & Fry.*

Entering the employment of the Caledonian Railway in 1882, after a brief spell in engineering work, which helped but to intensify an early acquired enthusiasm for all things "railway," he served in turn in a signal-box, as a parcels clerk, a booking clerk, a ticket inspector, and chief of "the flying squad." He took up whatever railway work came his way, and rightly held the view that the wider his knowledge the higher his value to his employers. They, in turn, approved that theory and sent him to Carlisle, where his energy, ability, and conspicuous tact were of the greatest service, not only to the Caledonian Railway, but to all the Scottish and English lines whose interests mingle at that busy railway centre. It was at Carlisle that Mr. Killin may be said to have made his mark. He handled the traffic competently, and in the adjustment of all matters that might have led to departmental worry he had the happy and unfailing knack of making the rough places smooth. From Carlisle, Mr. Killin went to be Assistant to the Western District Superintendent in Glasgow—a position he held until 1910, when he was appointed to the chief position of Western District Superintendent in Glasgow. In 1912 he received further promotion, being appointed Assistant Superintendent of the Line—a post which he filled with conspicuous ability until the present time, when he succeeds his late chief in the premier traffic position.

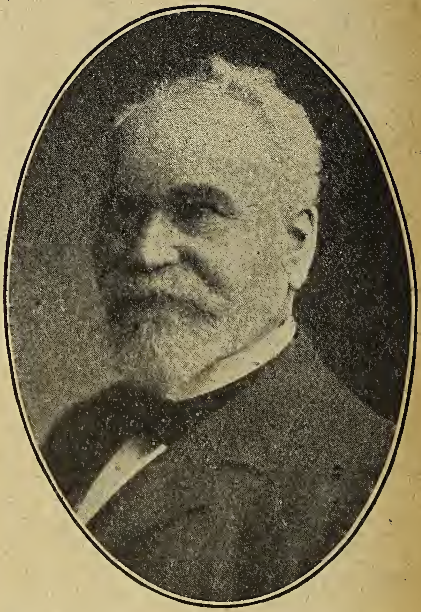
Mr. Killin is justly proud of having been a member of the first Caledonian Railway ambulance team to gain challenge cup honours, and his enthusiasm has been instrumental in fostering the railway ambulance movement tremendously. His social qualities also count in his favour. They are marked by a certain reticence; but the kindliness underlying a firm and purposeful way makes a blend of qualities that mark him out as a man to be trusted and respected. He has a bright sense of humour, and can recall many quaint experiences in his career of bustling activity. Rumour has it that he is an excellent amateur woodcarver, but a very indifferent golfer, having a liking for this game, but little time to indulge it. Mr. Killin had a son serving as an officer at the front. Curiously enough, it was practically on the day of his being appointed Superintendent that Mr. Killin received the welcome intelligence that his son was alive, although, unfortunately, a prisoner of war. After the close of the war we look for important developments on the Caledonian Railway, with which we have no doubt Mr. Killin will be prominently associated.

* * *

Mr. Robert Killin, who has been appointed Assistant General Superintendent of the Caledonian Railway, with headquarters in Glasgow, entered the Company's service in 1882, and, after passing through various grades was, in 1894, appointed chief of the special ticket examiners. In 1897 he became night stationmaster at Carlisle, and was thus brought into touch with the traffic passing between Scotland and England. He was, in 1908, selected to act as Assistant District Superintendent of the Western Division of the line, extending from Beattock in the south to Greenhill in the north, and two years later was chosen to succeed Mr. Watson as Superintendent of the same division. Mr. Killin who has, therefore, risen from the ranks, goes to his new position with a wide experience, and we are confident that our readers will wish him success. JULY 1912



MR. ROBERT KILLIN,
Assistant General Superintendent, Caledonian Railway



Photo] [*Lafayette.*
THE LATE MR. JOHN F. McINTOSH, M.V.O.

When early in February the death was announced of Mr. John Farquharson McIntosh, M.V.O., sometime Locomotive, Carriage and Wagon Superintendent of the Caledonian Railway, much regret was expressed in many quarters. Mr. McIntosh entered the service of the Scottish North Eastern in 1862, which line was absorbed into the Caledonian in 1866; he became a locomotive inspector in 1876, a district foreman in 1882, was put in charge of Polmadie shed—the largest on the system—in 1886, made chief of the running department in 1891, and Locomotive Superintendent in 1895. Mr. McIntosh, who retired in 1914, was President of the Association of Locomotive Engineers in 1911. In October of the same year His Majesty King George honoured Mr. McIntosh by creating him a Member of the Royal Victorian Order.

* * * MARCH 1918

Aug: 1907

Mr. Duncan Cameron,

ASSISTANT GENERAL GOODS MANAGER, CALEDONIAN RAILWAY.

THE appointment of Mr. Waddell to the position of General Goods Manager of the Caledonian Railway in succession to Mr. Hillhouse, referred to in the July issue of the RAILWAY MAGAZINE, has been followed by the promotion of Mr. Duncan Cameron to that of Assistant General Goods Manager of the Caledonian Railway.

Mr. Cameron entered the service of the Caledonian Railway at Buchanan Street Goods Station, Glasgow, and after being employed at that important station for some years he was transferred to the General Goods Manager's Office. In that office he had the advantage of serving in various capacities, first under the late Sir James Thompson, and latterly under Mr. Hillhouse; and for a number of years he was chief of the Claims Department—a position which brought him into close relations with the trading public, and also with the officers of the different English and Scotch Railways. In both of these relationships Mr. Cameron has exhibited marked ability and tact, and his promotion to his present position has given much satisfaction generally.

June 1913

MR. DUNCAN CAMERON, who has been appointed to succeed Mr. Matthew Waddell as Chief Goods Manager of the Caledonian Railway, is already well known in railway circles, having occupied the position of Assistant Chief Goods Manager during Mr. Waddell's tenure of office. He entered the service of the Caledonian Railway Company at Buchanan Street Station, Glasgow, and after being employed there for some years he was transferred to the General Goods Manager's Office. Passing through various divisions, Mr. Cameron was for a number of years, Chief of the Claims Department. He, therefore, takes up his new post well equipped by knowledge and experience for the duties attached to it.

CHANGE IN CHIEF GOODS MANAGERSHIP.

JUNE 1918.

MUCH regret is felt in Scottish commercial circles at the retirement on May 31st of Mr. Duncan Cameron, the Chief Goods Manager of the Caledonian Railway.

Mr. Cameron has been in rather an indifferent state of health for some time past, and has for that reason asked the Board of Directors to relieve him of further service. Some time ago he indicated a desire to retire, but at that time he was prevailed upon to remain. Mr. Cameron, who has been with the Caledonian Railway for the long period of forty-nine years, was appointed Chief Goods Manager in 1913, and he has thus occupied this responsible position for what have perhaps been the five most strenuous years in the history of the line.

MR. DUNCAN CAMERON.

Previous to his appointment as Chief Goods Manager, Mr. Cameron acted for a number of years as Assistant Goods Manager. Prior to that he passed through the rates and claims sections of the goods department, being head of the claims section, and his experience of the work of the goods department has probably been as varied and comprehensive as that of any railway officer in the United Kingdom. During Mr. Cameron's tenure of office, he has enjoyed the confidence of the Board of Directors and the management, and his services have been highly appreciated.

The Directors of the Caledonian Railway have appointed Mr. John Ballantyne to succeed Mr. Cameron as Chief Goods Manager. Mr. Ballantyne entered the service of the Caledonian Railway in 1892 as a clerk at Beattock station; was subsequently employed at various stations on the line in the capacities of booking clerk and goods clerk, and in 1897 was appointed to the position of Relieving Agent attached to the General Goods Manager's Office; he organised the Caledonian Railway Accounts Office, Glasgow, in 1910; was appointed Chief of the Accounts Office, Glasgow, in 1911, and ultimately held the positions of Chief Clerk to the Outdoor Goods Manager and Assistant to the Chief Goods Manager; appointed Chief Goods Manager, June 1st, 1918.

Photo] [*Lafayette, Glasgow.*

MR. JOHN BALLANTYNE.

The promoters cannot believe that the magistrates will oppose, as they (the promoters) intend to carry the Railway on the margin of the Tay for the entire length of the park—being about a mile—which it is obvious will give "a finishing touch" to its beauty.

Public Parks for the recreation of the people are now considered of so great importance, that the Lords of the Treasury lately contributed a large sum towards the improvement of Magdalen Green. The pro-

DUNDEE AND PERTH RAILWAY.

SUPPLEMENTARY PROSPECTUS,

NOT ISSUED
BY THE PROVISIONAL COMMITTEE.

This Railway has not yet been duly appreciated, so that it is necessary to issue a Supplementary Prospectus, in order to make the public acquainted with the real merits of the scheme.

The Railway will commence at the east end of Dundee, and will run for about a mile and a half along the most important streets of that town, crossing every street and communication leading from the Harbour and Docks to the town of Dundee.

If this should be opposed on the absurd plea of inconvenience or danger, the Railway may be formed on arches like the Greenwich, which cost 300,000*l.* per mile ; or the Blackwall Railway, which cost 400,000*l.* per mile; but the promoters of the Dundee and Perth Railway hope that this portion of their line will not, under any circumstances, cost more than 100,000*l.* per mile.

After leaving Dundee, the Railway will be carried through the Carse of Gowrie, where, owing to the fortunate circumstance of there being no towns or villages, and no local traffic, the promoters will be saved the expense of stations for fourteen miles. There is an unusual number of noblemen's and gentlemen's seats in the Carse, and as a Railway is generally considered ornamental, the promoters have no doubt that all those noblemen and gentlemen will give it their support.

It is then proposed to cross the Tay at a point where the river is half a mile wide, and navigable for ships of 400 tons burden. The River Commissioners have intimated their determination to oppose any description of bridge, because it would stop the navigation and destroy the Port of Perth; and the engineer to the Railway has therefore proposed that it should be "floated" or "swung" across. The promoters do not exactly understand what this means, and Captain Warner has suggested that the Railway may be projected across the river by "*a long range*," and as this seems the most practicable scheme, it will probably be adopted.

After reaching the south bank of the Tay, the Railway will be carried *in the same way* across the navigable river Earn, beyond which the course has not yet been determined. Two routes are open to the promoters, either through the grounds of Elcho Castle, belonging to the Earl of Wemyss (a determined opponent), or by a tunnel, not exceeding a mile in length, through Moncrieffe Hill.

The construction of the line, therefore, being so remarkably easy, the promoters think no reasonable doubt can be entertained that the engineer's estimate of 200,000*l.* for 21 miles, or about 9,000*l.* per mile, will be amply sufficient.

The fares will be fixed at the same scale as on the Dundee and Arbroath Railway, viz.:—

	d.		*s.*	*d.*
First class	2	per mile	3	6
Second class	1½	do.	2	6
Third class	1	do.	1	9

And the promoters have no doubt that passengers who have hitherto travelled between Dundee and Perth by steam for sixpence, will hereafter prefer the Railway.

With regard to the probable amount of dividend, the promoters think it sufficient to direct attention to the great success that has attended other railways running parallel to rivers, viz.:—

The Glasgow and Greenock pays	2½ per cent.
Newcastle and Shields	2 per cent.
London and Greenwich	nil per cent.
London and Blackwall	nil per cent.

And the promoters have no doubt, when the traffic on the Dundee and Perth is fully developed, that it will pay as large a dividend as either of the two last-mentioned railways.

DUNDEE AND PERTH RAILWAY.

SECOND SUPPLEMENTARY PROSPECTUS.

The promoters beg to congratulate the shareholders on the excellent prospects they have of being able to carry this Bill ; but as some ignorant people fancy there are insuperable obstacles, the promoters will take this opportunity of answering a few of the objections.

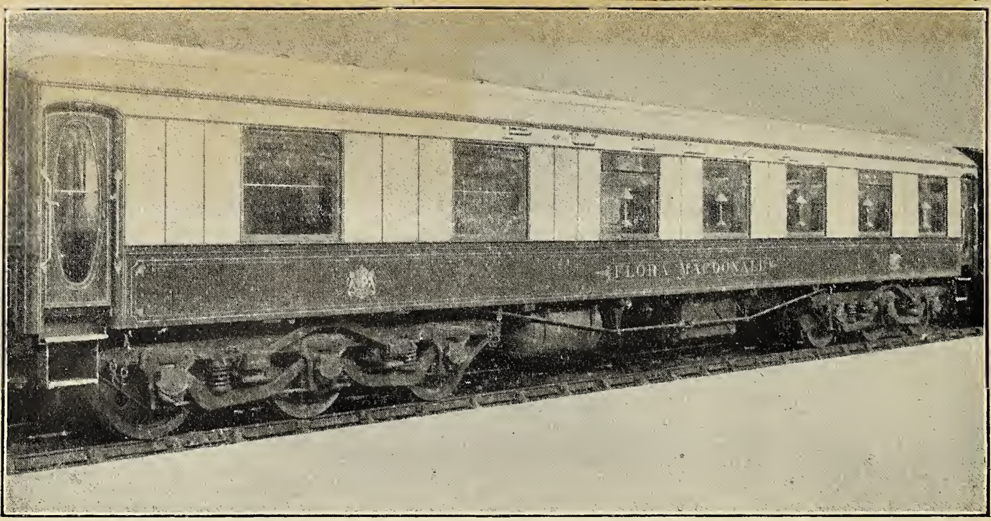
It is said, the Railway cannot be carried through the grounds of Elcho Castle or Moncrieffe House : but this is nonsense. Did not the Eastern Counties Railway carry their line through a corner of Lord Petre's grounds, and completely vanquish his Lordship, by paying him 120,000*l.*? Why, then, may not the Dundee and Perth Railway carry their line, in the same way, through the grounds of the Earl of Wemyss and Sir Thomas Moncrieffe ?

Then it is said, who ever heard of a railway being "floated" or "swung" across two navigable rivers, then carried for some miles on an embankment in the sea, and then through the middle of a great harbour, like that of Dundee?

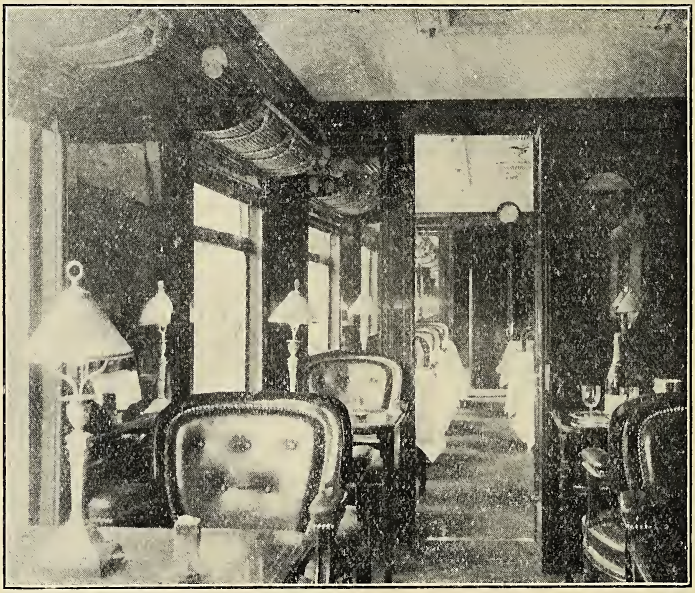
The promoters admit they never heard of such a thing, and that it will be rather difficult and expensive; but it will not be impossible, if they get the consent of the Lords of the Admiralty, the Woods and Forests, the Board of Trade, the River Commissioners, the City and County of Perth, and the Magistrates and Harbour Trustees of Dundee. These parties are, in the mean time, hostile, but the promoters still hope they will consent—"floating" and "swinging" passengers across rivers being such a novel and interesting experiment.

With regard to not being able to carry the Railway through noblemen's and gentlemen's parks in the Carse of Gowrie, the promoters anticipate no difficulty, as they intend to follow the precedent of the Eastern Counties Railway and Lord Petre.

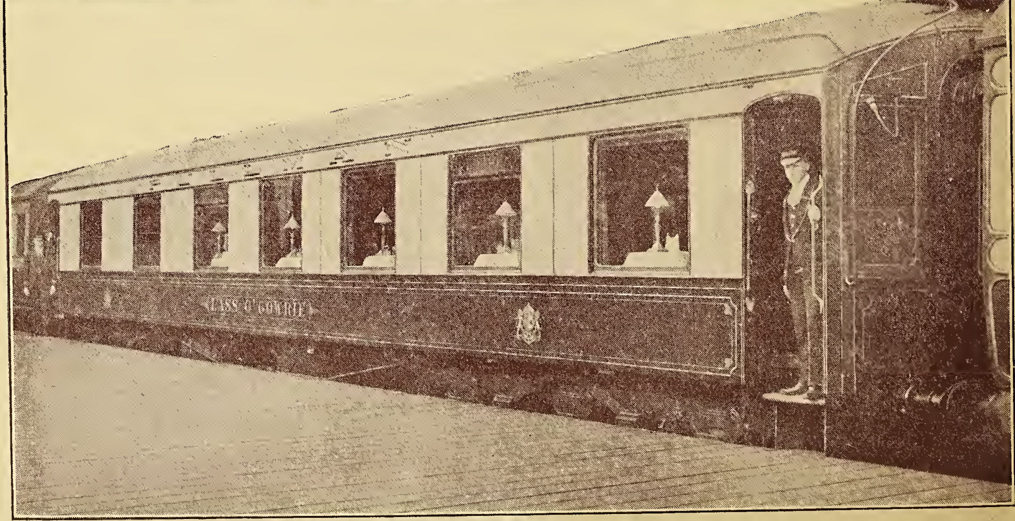
Then it is said that the magistrates of Dundee will not allow a Railway to be carried through Magdalen Green, as it would destroy that beautiful park, which is the only place where the inhabitants can enjoy the privileges of recreation and sea-bathing.



PULLMAN DINING CAR USED ON GLASGOW AND NORTH SERVICE, CALEDONIAN RAILWAY.



INTERIOR OF PULLMAN DINING CAR USED ON GLASGOW AND NORTH SERVICE, CALEDONIAN RAILWAY.



CALEDONIAN RAILWAY PULLMAN DINING CAR, *Lass O'Gowrie*, RUNNING IN THE GLASGOW–ABERDEEN SERVICE.

Pullman Cars on the Caledonian Railway.

* * *

Pullman Cars on the Caledonian Railway.

Except for the use of Pullman sleeping cars in earlier years on through Anglo-Scottish trains, Pullman vehicles have been unknown north of the border; but the directors of the Caledonian Railway now announce that they propose introducing such cars on trains between Glasgow and Aberdeen, Edinburgh and Oban, as well as on certain long-distance residential routes. The vehicles are being constructed in Sheffield, and are intended to incorporate the best Pullman practice in respect of excellence of equipment and design. It is understood that on the Oban route, Pullman observation cars will be used; while on all services provisions will be made for the supply of light refreshments, as well as more elaborate meals, the cars to some extent completing the arrangements at present in force in regard to restaurant accommodation.

* * *

On March 1st the Caledonian Railway resumed the service of Pullman Cars, inaugurated with great success on that lioe in the summer of 1914, but which had to be suspended in consequence of the war.

At present the Pullman service consists of buffet cars between Glasgow and Edinburgh, dining cars between Glasgow and Carlisle and between Glasgow and Carstairs, and between Glasgow, Perth, and Aberdeen.

These cars, it will be remembered by all who experienced the pleasure of travelling in them, are luxuriously and elegantly furnished, have arm-chairs as seating accommodation, and embrace in their equipment every appliance that makes for the maximum of convenience and comfort; being, indeed, described as the finest of the kind that have ever been built.

They consist of dining cars, buffet cars, and an observation buffet car. The dining cars contain first and third class accommodation, for which there is no extra charge; the buffet cars are available for first-class passengers on payment of a small supplementary charge. All the seats are numbered, and may be reserved.

An attractive feature in connection with these cars is the novelty of naming them after feminine celebrities suggestive of the romance and charm of Scottish history and song. With due appreciation of the fitness of things, the cars, on their first introduction, were appropriately allocated to their respective regional routes. Thus "Helen MacGregor," "Flora Macdonald," "Lass o' Gowrie," "Fair Maid of Perth," and "Duchess of Gordon," ran between Glasgow and Aberdeen and Edinburgh and Aberdeen; "Annie Laurie" on the Moffat service; "Baroness Nairne" between Glasgow and Crieff; and "Maid of Morven" on the Oban route; while between Glasgow and Edinburgh plied The Four Marys—*viz.*, "Mary Hamilton," "Mary Beaton," "Mary Seaton," and "Mary Carmichael."

R.T.M. April 1919.

Our paragraph under this heading last month requires correction in regard to certain details. In addition to cars mentioned, *Mary Hamilton*, dining car, is running between Glasgow (Buchanan Street) and Dundee; and *Mary Beaton*, a parlour buffet car, on the Edinburgh-Glasgow route. *Duchess of Gordon* and *Baroness Nairne* are cars whose completion has been delayed by the war, and are not yet in service. The following trains are now equipped with Pullman car facilities:—*Glasgow to the North:* 7.0 a.m. (breakfast car to Perth); 9.45 a.m. (luncheon car, Perth to Aberdeen); 1.30 p.m. (tea car, Perth to Aberdeen); 5.0 p.m. (tea and dining car to Perth and Dundee); 6.15 p.m. (dining car, Perth to Aberdeen). *From Aberdeen to Glasgow:* 6.10 a.m. (breakfast car to Perth); 9.0 a.m. (luncheon car, Dundee, 10.30 a.m., to Glasgow); 12.0 noon (luncheon car, Aberdeen to Perth); 5.30 p.m. (tea and dining car, Aberdeen to Glasgow). On these services the Pullman cars are available for first and third-class passengers without extra charge. *Glasgow to Edinburgh:* Breakfast, buffet, luncheon, or tea and dining cars, 8.40, 11.0 a.m., 1.30, 4.0, 5.5 (except Saturdays), and 6.45 (Saturdays only) p.m. *Edinburgh to Glasgow:* 8.50, 11.0 a.m., 1.30, 3.45, 5.0 (except Saturdays), and 7.5 (Saturdays only) p.m. These are for first-class passengers only. Supplement, 1s.

Southern Routes: 11.30 p.m., sleeping car express ex Euston has the Pullman car *Fair Maid of Perth* attached between Carlisle and Glasgow daily (including Sundays) for serving breakfasts, and returns as a tea and dining car on the 4.35 p.m. ex Glasgow (Central). The 9.15 a.m. ex Euston has a Pullman dining car attached from Carstairs to Aberdeen, the return service being by the 9.0 a.m. Aberdeen to Carstairs. These facilities are proving very popular, and in due course the full Pullman car accommodation contemplated will be installed.

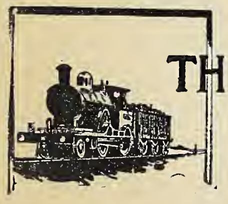
R.M. May 1919.

Since their first introduction, Pullman cars have abundantly justified their inclusion in the make-up of Caledonian Railway trains. It is true that to some extent, as between Carlisle, Carstairs or Symington and Perth, and between Glasgow and Perth and Aberdeen, they replace the restaurant cars previously provided, and are available for both first and third-class passengers without supplement. To that extent, therefore, their *clientèle* is virtually that of a main line restaurant car, although the accommodation is more palatial in character. The conditions are not, however, directly comparable to those which apply when Pullman cars are operated as supplementary to the ordinary accommodation. Between Edinburgh and Glasgow a number of Caledonian trains include first-class Pullman cars for which supplements are charged, while on the Oban line a Pullman observation car is operated during the summer months, and this has proved very popular indeed. Commencing June 1, 1922, the Pullman Car Company operated, by arrangement with the Caledonian and Highland Railways, a Pullman dining car running between Glasgow and Aviemore. This proved so popular that a second car had to be added from August 21, 1922, during the pressure of the tourist season, and this continued to run until October 14. We are indebted to Mr. C. M. Trott, the Pullman Car Company's representative in Scotland (his headquarters being at the Central Station, Glasgow, Caledonian Railway), for the following particulars of numbers of passengers conveyed and meals served in Pullman cars during June, July and August of last summer. In June, 12 cars carried 14,912 passengers and served 13,995 meals. In July, 12 cars carried 16,814 passengers and served 15,740 meals. During August, 13 cars were running, carrying 18,090 passengers and serving 17,101 meals, and in September they conveyed 18,697 passengers and served 17,640 meals. In connection with the cars running on the Highland Railway, we are informed that during June, 1,643 meals were served, and 2,622 in July, and 2,868 in August, and 3,821 in September.

R.M. JAN. 1923

Carriage and Wagon.

CALEDONIAN.



THE new bogie brake vans recently introduced by Mr. McIntosh, Locomotive Superintendent, Caledonian Railway, are being much appreciated by the guards. A guard who has been on the road for about thirty years states that they are most convenient and comfortable, and that they are a pleasure to travel in as compared with the six-wheelers, which subjected the guards to much rough jostling when working in the van while the train was running at a high rate of speed.

R.M. JAN: 1899

The Busy Caledonian.

British railways often borrow coaches from other companies when press of traffic makes unusual demands upon their rolling stock. This summer, during the Glasgow Fair Holidays, the Caledonian Railway had to do likewise, and on Thursday evening, the 10 p.m. north bound train from Buchanan Street, Glasgow, was run in three sections; the third to Oban was composed of 18 coaches, of which 15 were Great North of Scotland Railway 4-wheelers. The line controlled from Aberdeen apparently thinks this class of coach is good enough for Glasga' Fair trippers. On the other hand, the Caledonian Railway's excursion to London on the same evening, from Glasgow Central, was composed of ten of the new eleven compartment corridor bogies (12 wheelers). As these coaches weigh about 37 tons each unloaded, and seat 110 passengers, Mr. MacIntosh's giants have a fair task before them when hauling these trains unpilotted. However, on this occasion, two 4-4-0 locomotives were employed.

There can be no doubt that consequent upon the extremely liberal excursion fares quoted by the Scotch railways, residents north of the Tweed take greater advantage of the holiday trains than do English people. Yet to observe the crowds that gather on the platforms to bid the traveller *bon voyage*, one would imagine that a railway journey was quite a rare event. So great was the crowd bidding adieu to friends journeying south at the Central station, that long before the train was due to start the platform barriers had to be closed, and thereafter only passengers were admitted.

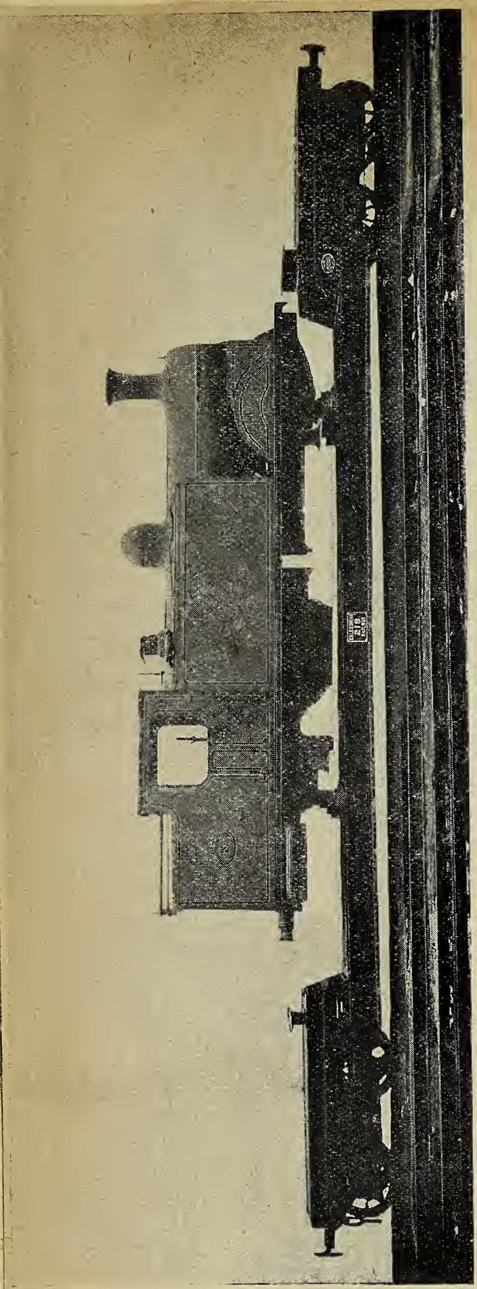
R.M. AUG: 1907

The Caledonian Railway has an economical type of lavatory coach. It is usual for a seat to be sacrificed to provide an entrance to the lavatory. Some of the older carriages with lavatory accommodation, on the Caledonian Railway, however, seat the full complement of passengers, the back of one of the seats forming the door by which the lavatory is entered, the cushion of the seat lifts off, and the frame is a hinged flap. A man can step over the seat, but a lady would probably have to remove the cushion and turn up the seat. If the seat that gives entrance to the lavatory be occupied, and any other passenger desires to enter, or come out of, the lavatory, a rather inconvenient state of affairs is introduced. This has been recognized by the Caledonian Railway, and the arrangement is being altered when coaches of this type are in the shops for thorough overhauling. RTM. May 1910.

Callander & Oban Observation Car

In July, 1914, Pullman restaurant cars were introduced on the Caledonian Railway services between Glasgow, Perth, and Aberdeen, as well as Pullman parlour cars on the Edinburgh-Glasgow service and on the Tinto Express between Glasgow and Beattock. Later, a Pullman observation car, called the *Maid of Morven*, was put on the Glasgow-Oban service for first class passengers. Apart from the interruption of the latter part of the 1914-18 war, these cars continued in service under Pullman auspices, after the formation of the L.M.S.R., until the expiry of the Caledonian-Pullman agreement in 1934. The L.M.S.R. then bought the cars, and continued to run them until the withdrawal of all restaurant cars in the present war. All the parlour cars became composite restaurant cars; the *Maid of Morven* was, we believe, still used as a first-class observation car, but without supplementary charge.

RM S-O 1944 [Reply to D. Campbell



TESTING A NEW BOGIE TROLLEY WAGON WITH A LOAD OF OVER 30 TONS, CALEDONIAN RY.

BOGIE TROLLEY WAGON, CALEDONIAN RY.

THE Caledonian Ry. have added to their already extensive stock of special class wagons a new type of trolley, intended particularly for the conveyance of armour plate and miscellaneous iron and steel plates of exceptional dimensions, and up to 30 tons weight.

The trolley measures 61-ft. 8-in. over the buffers, and is carried on two four-wheeled bogies of the diamond frame pattern, the wheels of which have cast steel centres and journals 12-in. by 6-in. diameter.

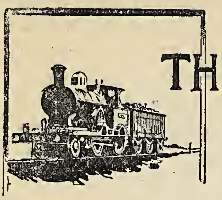
The well consists of four girders of ⌶ section 1-ft. 4-in. deep by 6-in. broad, strengthened by rivetted plates on top and bottom flanges. The centre girders extend close to the inside axles, and are placed at 1-ft. 6-in. centres, in order to afford sufficient side play for the wheels when taking curves even of 1½ chains radius. The girders are tied together with wrought iron knees of rectangular section, 2½-in. by 1½-in., thereby providing a clear space of 35-ft. in length between the centre and side girders, and at a height of only 10-in. above rail level, thus accommodating the utmost size of plates possible with the gauge limitations. The trestles can be readily shifted from one side to the other to suit loading requirements, and may be removed altogether to accommodate loads of other descriptions, the cross girders of ⌶ section over the ends being intended for supporting a long beam when carrying special loads.

These trolleys, built at St. Rollox to the designs of Mr. J. F. McIntosh, locomotive, carriage and wagon superintendent, and the first of which has just been turned out, can carry the largest sizes of plates hitherto made, up to 35-ft. by 12-ft. 9-in., and can thus convey, by any ordinary goods train at usual speed, exceptional loads which otherwise could only be dealt with on Sundays and by blocking the opposite set of rails.

L.M. April 1908.

Train Services.

CALEDONIAN.



THE 8 p.m. express from Aberdeen to the South is now timed to do the—at present—fastest booked run on record in the kingdom—viz., from Forfar to Perth ($32\frac{1}{2}$ miles) in 33 minutes, so that the booked speed is almost 60 miles an hour.

The tourist arrangements of the Caledonian Railway are on a specially liberal scale this summer—cheap fares, plenty of fast trains, and other facilities being to the fore everywhere. It is evident that both Sir James Thompson and Mr. Irvine Kempt believe in a liberal policy for developing traffic.

The splendid arrangements which are announced for Dundee mark a distinct advance by the Caledonian Company, and have for their object the greater development of the residential traffic with that town. Fast express trains are to leave Dundee in the afternoon immediately after business hours to convey business men to Crieff and Comrie, also to Blairgowrie and Alyth, as well as to Forfar and Kirriemuir, and corresponding trains are arranged to bring the business men to Dundee for 9 and 10 o'clock in the morning.

Not content with running so many new express trains, the Caledonian Company has arranged to reduce the fares from Dundee during the travelling season—from June to October. Crieff is distant about 40 miles, but the Company will carry you from Dundee to that place and back for 3s. 8d.—surely cheap enough for a journey of 80 miles! Other fares in proportion.

Fortnightly season tickets are also to be issued on as liberal a scale; indeed, nothing has been left undone by the Company to accommodate the wants of the Dundee district.

R.M. June 1898

THE summer train service on the Caledonian Railway is generally on the lines of that which was in operation last summer, but many alterations and schedule changes are involved, besides several accelerations and improvements. Many of the new developments were introduced on May 1st. Others will come into force on July 1st. A new express train will leave Crawford at 7.10 a.m., calling at all stations to Carstairs, as also at Braidwood, Law Junction and Wishaw (Central), reaching Glasgow (Central) at 9 a.m. The Edinburgh connection from Carstairs is due Princes Street 9.20 a.m. The "Tinto Express" from Moffat at 7.42 a.m. will call at Motherwell in both directions, providing direct connection with Hamilton. In continuation of the policy of developing the residential districts within easy reach of the large towns, the train service between Glasgow and Strathaven has been remodelled, and beyond accelerated and improved services, additional trains are being run—from Strathaven express at 9.20 a.m., reaching Glasgow 10.11 a.m., and a new connection to Glasgow in the afternoon. From Glasgow two new express trains are run at 4.20 and 6.3 p.m., reaching Strathaven at 5.5, and 6.45 p.m., respectively. A late train is run daily from Glasgow to Strathaven. These services, in operation since May 1st, are greatly appreciated. The success which followed the recent improvements on the Cathcart District Railway in Glasgow has induced the Company to adopt a similar course with their Edinburgh suburban train service, and the schedules on both the Barnton and Balerno branches have been remodelled. In the case of the Barnton branch seven new trains are being run in each direction, and on the Balerno branch four in each direction.

Last year's excellent residential services to and from Glasgow and Edinburgh and Stirling, Bridge of Allan, Dunblane, Callander and Crieff are maintained. The "Strathearn Express" from St. Fillans and Crieff to Glasgow and Edinburgh, which, except for a call at Larbert to detach the Edinburgh portion, had a non-stop run last year from Gleneagles to Glasgow and Edinburgh, now calls at Stirling, giving this important residential town a non-stop run to Edinburgh and Glasgow. The Edinburgh portion is there detached, and the Glasgow and Edinburgh trains run from that point to destination without stopping. The 4 p.m. express from Glasgow to Stirling and beyond will leave at 4.5 p.m., but arrival at Crieff is unaltered. On the 4.45 express from Glasgow to Callander there will be a portion for Crieff detached at Dunblane and run thence non-stop. This takes the place of the 4.55 p.m. "Strathearn" express of last year. A new train leaves Buchanan Street for Callander at 5.20 p.m., first stop Stirling, then calling at Bridge of Allan, Dunblane and Doune. It will take forward from Dunblane passengers out of the 4.50 p.m. "Strathearn Express" from Edinburgh. The new train will be entitled the "Ben Ledi" express. A new train is being run from Perth to Coupar Angus and Blairgowrie at 5.15 p.m., calling at all local stations.

The 11.10 p.m. express from Glasgow (Central) to Carlisle, Liverpool and Manchester leaves at 11.20 p.m. (except on Satuidays) and runs separately from the 10.5 p.m. express from Perth to Carlisle and London (Euston) instead of being combined at Motherwell as hitherto. On Saturdays the train leaves at 11.15 p.m. for the convenience of theatrical parties returning south. The 9.55 a.m. Sunday theatrical train Glasgow (Central) to Carlisle and London, which is highly popular, will not convey for Motherwell local passengers, who will now travel by the 10.30 a.m. train from Glasgow (Central) to Stirling. This arrangement provides a new Sunday service from Glasgow to Hamilton, and from Hamilton and Motherwell to Coatbridge, Larbert and Stirling.

A decided departure is being made with the 7.15 a.m. morning tourist train from Glasgow (Buchanan Street) to Oban. It will be altered to leave at 8 a.m., and the later departure should prove of great advantage to tourist and excursion parties. The train will cease calling at Bridge of Allan and Dunblane. The later departure from Glasgow allows a splendid connection to the Oban line to be given out of the 11.45 p.m. sleeping car express from London (Euston) to Aberdeen at Stirling, adding a new and improved service between London and Oban and the Western Highlands by the West Coast route. In the other direction, the 7.55 a.m. morning express from Oban to Glasgow, Edinburgh and London, leaves at 7.30 a.m., and runs direct to Glasgow (Central) station, where the London portion will be attached to the 12 noon express from Glasgow to London. The 10.5 a.m. express from Aberdeen to Carlisle and London (Euston) now includes a portion for Edinburgh, which will be taken forward from Perth to Larbert by the 12.35 p.m. Perth to Symington. The arrangement of running a through carriage from Glasgow and Edinburgh to Blackpool at the week-ends, which was begun last year, was very successful, is repeated this year. The carriage is conveyed on the 10.10 a.m. from Glasgow (Central). The new service inaugurated last year between Scotland and the Isle of Man *viâ* Fleetwood was also a great success, and is repeated, connections being given every Friday, Saturday and Monday by the 10.10 a.m. from Glasgow (Central) and the 10.5 a.m. from Edinburgh (Princes Street), connecting at Fleetwood with the turbine steamers *Ben My Chree* and *Viking*. This year an entirely new route from Scotland to the Isle of Man is being opened up, namely, *viâ* Carlisle, Maryport and Whitehaven, thence by the R.M.S. *Tynwald* to Ramsay, the sea passage occupying 1¾ hours. The service is to be maintained every Tuesday and Thursday from July 2nd to September 5th, and convenient connections have been arranged with Caledonian trains at Carlisle.

R.M. JULY 1912.

Most of the special residential trains which have formed so prominent a feature for several years past on the Caledonian Railway came into force on May 1, and on June 1 were supplemented by a number of excursion and tourist trains. The full summer time-table will apply from July 1 and will include a number of detail alterations and improvements as compared with last year's arrangements conducing to convenience of travel. Commencing July 1 many of the important main line trains will be run in duplicate. For instance, the popular 10 a.m. and 2 p.m. trains from Buchanan Street to Perth, Dundee and Aberdeen, will be divided. As in former years, the feature of the summer train arrangements is the excellent service provided for residential purposes. With regard to the Clyde coast services times have been adopted which are to become standard times, and in the case of the residential services the same times will apply all the year round. The Sunday train services constitute the only decided departure. The new arrangements apply both at Edinburgh and Glasgow. In the case of Edinburgh the new service is being run between Princes Street and Balerno, with an entension of the morning and evening train to West Calder. Five trains are run in each direction calling at intermediate stations. The first train leaves Princes Street at 12.35 p.m., running all the way to West Calder, then at 2.35, 4.35, and 6.35 to Balerno, and 8.5 p.m. to West Calder. In the Glasgow district considerable attention has been drawn to the company's action in introducing a Sunday service between Glasgow Central) and Whitecraigs station. The latter station is only three minutes walk from Rouken Glen, a large public park, with Mansion House, given to the city by Lord Rowallan. The Glasgow Corporation Tramway services cannot cope with the traffic, although running cars as closely as possible. The new Sunday service inaugurated by the Company to Whitecraigs will enable many people to visit this lovely spot, when otherwise they would have difficulty in doing so. The service began on the first Sunday in June, and 10 trains are being run in either direction, commencing at 1.30 p.m. from Glasgow and every half hour thereafter until 6 p.m., returning immediately from the Glen with the last train leaving at 8.45 p.m.

RM JULY 1913

The most important feature is the inauguration of Pullman cars on a large number of express services. As previously indicated, 17 cars will be utilised on the various services: four dining cars, twelve buffet cars, and one observation car. The dining cars will be used on the express services between Glasgow (Buchanan Street), Perth and Aberdeen, and they are now running on the following trains: From Glasgow (Buchanan Street) at 7.30 a.m., 10 a.m. and 5 p.m.; from Aberdeen at 10.5 a.m. (10.35 a.m. from July 1st), 1.10 p.m. (12.50 p.m. from July 1st) and 5.30 p.m. The buffet cars are now also running on the more important express trains between Glasgow (Central) and Edinburgh (Princes Street). Cars will also be used on the main line services, including a buffet car on the "Tinto" residential express between Glasgow (Central) and Moffat, and on the "Strathearn" residential express between Glasgow (Buchanan Street) and Crieff. The observation car is to be run between Glasgow (Buchanan Street) and Oban.

As regards new train services, from July 1st an important acceleration will be made in the through service between Glasgow (Central) and Newcastle *viâ* Carlisle. The 10 a.m. express from Glasgow (Central) to Carlisle will have an express connection from the latter point to Newcastle, arriving there at 1.45 p.m. This is an acceleration on the service hitherto provided of 65 min., and gives the fastest service between Glasgow and Newcastle. Improvements are being effected in the Glasgow (Central) and Newcastle service generally, and a new train is also being run from Newcastle at 11.20 a.m., reaching Glasgow at 4.20 p.m. So far as the through services to England are concerned, there is little change to record.

A new Sunday train service has also been introduced from June 1st between Glasgow (Central) and Edinburgh (Princes Street) particularly for the purpose of serving the local districts situated between the two cities.

RM JULY 1914

On the down journey we had no: 901, with a miscellaneous load of three Lancashire & Yorkshire, one Caledonian,

and two West Coast corridor coaches, plus a twelve-wheeled West Coast dining car —total 220 tons. The usual brisk "Caley" start to Gretna was made, this initial 8⅝ miles taking 11 min. 25 sec. with a maximum just exceeding a mile-a-minute over the Solway bridge. Up the 7½ miles at 1 in 193-200 past Kirkpatrick our minimum was 45 miles per hour, and the same figure was repeated on the final 4¼ miles at 1 in 200-203 to Brackenhill summit. Thus the 8⅛ miles from Gretna to Kirtlebridge took 10 min. 40 sec., and the subsequent 9 miles to Lockerbie 10 min. 25 sec. Beyond Lockerbie, on the 5 miles down at 1 in 528 which succeed the short 1½-miles drop at 1 in 200, a top speed of 68·1 miles per hour was touched, while a rate of 66·2 miles per hour was sustained for some distance beyond. Thus the 8¾ miles from Lockerbie to Wamphray were covered in 8 min. 20 sec., and the last 5¼ miles up to Beattock station were completed smartly in 6 min., giving a total time of 46 min.

50 sec. for the 39¾ miles from Carlisle. This showed an excess of 50 sec. on schedule time, but was amply atoned for on the subsequent stage.

Attaching a 0–4–4 tank engine in rear, a surprisingly rapid start was made up the famous bank, an acceleration to 38·9 miles per hour being recorded on an average grade of from 1 in 70 to 1 in 88. On the very steep 1 in 69 section near the summit, the speed fell temporarily to 35·7 miles per hour; but the summit, 10 miles from Beattock, was passed in 17 min. 5 sec. from the start—the smartest climb I have ever yet recorded. This gave the driver several minutes in hand, so that a most moderate descent to Carstairs followed, no higher speed than 68·1 miles per hour being touched. The 8⅛ miles from summit box to Abington took 8 min. 25 sec.; the 9 miles thence to Symington 9 min. 5 sec., and the last 6⅛ miles to Carstairs stop 7 min. 50 sec. So the total time for the 33¼ miles from Beattock was 42 min. 25 sec., and indicated a gain of 1 min. on schedule time from Carlisle.

The more noteworthy run by far, however, was that which I secured on the return journey to Carlisle behind No. 889, an engine of the same type. I joined the 2 p.m. *ex*-Edinburgh at Symington, and it was made up there to the really substantial load, for this class of engine, of 5 twelve-wheelers and 4 eight-wheelers, or 315 tons in all. A good start is afforded from Symington down a brief 2½ miles at 1 in 184 to the Clyde bridge, over which length we accelerated to exactly 60 miles per hour, passing Abington, 9 miles, in 11 min. 50 sec. Some fine work was recorded up the continuous grades of 1 in 240 to 330, Elvanfoot, 5¼ miles further on, being passed in another 6 min. 35 sec. On the final 2¼ miles at 1 in 99, however, speed fell more rapidly to a minimum of 33·3 miles per hour, so that the 2⅞ miles from Elvanfoot to Summit box took 4 min. 20 sec. It was, however, a noteworthy achievement for No. 889 to breast the summit with 315 tons in 22¾ min. from Symington—a total distance of 17⅛ miles. On the descent to Beattock the pace was unusually cautious. No higher speed than 68 miles per hour was recorded, while for the major part of the distance it was more nearly 55 or 56 miles per hour. Thus the 10 miles from the summit down to Beattock consumed as much as 10 min. 40 sec.

Even on the subsequent 4 miles at 1 in 202 beyond Beattock the maximum was only 64·3 miles per hour, but after this matters began to improve. On the undulating stretch following to Lockerbie a higher maximum of 66·2 miles per hour was attained, the 14 miles from Beattock to Lockerbie being covered in 13½ min. The 5 miles at 1 in 528 and final 1¾ at 1 in 200 to Brackenhill summit only reduced our speed to a minimum of 48·4 miles per hour, and then a remarkable effort was made. Down the first 4¼ miles at 1 in 200–203 a maximum of 70·3 miles per hour was touched. This fell on the level stretch beyond to 64·3 miles per hour, but was succeeded on the final 7 miles of 1 in 193–200 to Gretna by the high maximum of 80·3 miles per hour—the first 80 record I have ever secured on the Caledonian Railway. The 5⅝ miles from Lockerbie to Ecclefechan occupied 6 min. 20 sec., after which the ensuing 11½ miles to Gretna were covered in 9 min. 55 sec., the 4½ miles thence to Rockcliffe in 3¾ min., and the last 4⅛ miles into Carlisle in 4 min. 50 sec. In this way the following times into Carlisle were secured:—from Lockerbie, 25¾ miles, 24 min. 50 sec.; from Beattock, 39¾ miles, 38 min. 20 sec.; from Beattock summit, 49¾ miles, 49 min.; and from Symington, 66⅞ miles, 71¾ min. The booking is one of 75 min., but with a slightly more rapid descent from Beattock summit, especially south of Beattock station, a net time of 70 min. or even less might with ease have been achieved. I consider this a particularly fine performance in respect of the type of engine employed.

A run with one of the larger 140 class of 4–4–0 engines, and a still heavier load, may with advantage be compared with the last-mentioned. The train in this case was the 10 a.m. *ex*-Glasgow, loaded to 5 twelve-wheelers (two dining cars and three Caledonian "Grampian Corridor" coaches), together with 6 eight-wheelers, the train of 54 axles weighing in all 380 tons. In view of the load, the services of an early 4–4–0, No. 90, were allowed as pilot to No. 143 as far as Beattock summit. The day was historic in that it was the occasion of the devastating downpour in the Eastern Counties of last summer, and we had rain throughout to Carlisle. A smart run was made from the Central station to Motherwell. This 13¼ miles, with its clear rise of 200 ft., occupied only 18 min. 20 sec. from start-to-stop. The 5½ miles from Motherwell start to Law Junction were covered in 12 min., and the 7¾ miles thence to Cleghorn in a further 12 min., each section being steeply inclined upwards at from 1 in 143 to 1 in 98. Carstairs, 16 miles from Motherwell, was passed at reduced speed in 27¼ min. Beyond Thankerton we were checked by signal, presumably on account of the late running of the Edinburgh portion in front, but we passed Symington, 6⅝ miles from Carstairs, in 8 min. 40 secs. ran from Symington to Abington, 9 miles, in 10 min. 25 sec.; Abington to Elvanfoot, 5¼ miles, in 6 min. 40 sec.; and Elvanfoot to a stop at the summit box, 2⅜ miles, in 4 min. 20 sec. This gave a total time of 57 min. 20 sec. (55¼ min. net) for the 39¾ miles up from Motherwell, which include a clear change of level of over 770 ft. Here the pilot was detached.

On the descent to Beattock the speed varied from a maximum of 75 miles per hour to a minimum of 52·9 miles per hour (after a severe brake application), and was further severely reduced in consequence of permanent way operations near Greskine box. Thus it took 12 min. 5 sec. from the summit start to pass Beattock, 10 miles; but with further maxima of 73·8 miles per hour at the foot of the 1 in 202, and 70·3 near Nethercleugh, the 14 miles from Beattock to Lockerbie were covered in 12¾ min. The 5⅝ miles from Lockerbie to Ecclefechan on this occasion took 6 min. 10 sec. On the first descent past Kirtlebridge 70·3 miles per hour was the top speed touched, but this was substantially improved on by a maximum of 76·3 at Gretna. The 11½ miles from Ecclefechan to Gretna took 10 min. 50 sec., and the 4½ thence to Rockcliffe 3 min. 50 sec. A serious delay outside Carlisle, however, made the last 4⅛ miles take 5 min. 40 sec.; but even then the total time for the 49¾ miles from Beattock summit had been only 51 min. 20 sec., with this 380-ton coach load. The net time was about 49 min.; the gross time from Glasgow with the conditional stop at Motherwell (2 min. 10 sec.), the stop at Summit box (2¼ min.), signal checks at Thankerton and outside Carlisle, as well as the permanent way check on Beattock bank, was one of 2 hours 11 min. 25 sec., or 35 sec. under schedule—an excellent record with such a load.

R.M. June 1913.

Fastest Runs, Caledonian Railway.

Next to the 34 min. run of the 4.20 p.m. from Forfar to Perth (32.5 miles at 57.4 m.p.h.), comes a 55.7 m.p.h. "snippet" by the 8.41 p.m. from Forfar to Coupar Angus (16.7 miles in 18 min), and a 54.2 m.p.h. journey over the 39.7 miles from Beattock to Carlisle by the 11.56 a.m. express in 44 min.

R.M. March 1921

Considerable improvements are announced in the service of trains on the Caledonian Railway. Apart from the West Coast joint service, the Peebles and Moffat districts are specially favoured in this respect. The trains that particularly provide these new facilities are the following, viz.: 4.45 p.m. train from Glasgow (Central) to Peebles and Moffat. The first stop will be at Symington, 36 miles from Glasgow (Central). This train affords an improved service for residential traffic from Glasgow to Peebles and Moffat, both noted hydropathic resorts. Other stations in the district, including the newly-opened Leadhills line will also benefit. This train also provides a splendid day service from England to Peebles in connection with the 10.0 a.m. train from Euston.

5.55 p.m. train from Glasgow to Peebles, and 6.0 p.m. train from Edinburgh to Peebles. By these trains the journey to Thankerton, Symington, Biggar and Peebles is improved by 15 minutes, the Peebles carriages being detached from the up limited mail *en route*, and run on in advance.

9.5 p.m. train from Glasgow (Central) and 9.10 p.m. train from Edinburgh (Princes Street) to Carlisle. These trains will now have a connection to Lanark and Dumfries, new branch trains having been put on to arrive at Lanark at 10.13 p.m., and Dumfries at 11.30 p.m., respectively.

In the opposite direction, in order to still further cultivate a residential traffic several fast trains will be run.

To improve the train service from Dumfries to Edinburgh, the 9.45 a.m. train from Stranraer to Lockerbie will be extended all the way to Edinburgh, arriving there at 3.25 p.m., showing a quickened service by 25 minutes.

The usual full summer service between Glasgow and Edinburgh and the North, East and Western districts of the Caledonian Railway system will be inaugurated. Amongst the trains in this direction that are worthy of special mention are:—

A new express train which will leave Edinburgh (Princes Street) for Larbert at 7.25 p.m., where it will connect with the 8.0 p.m. train from Glasgow, thus affording a later service to Callander and Crieff, where passengers arrive at 9.30 p.m., and 9.53 p.m., respectively.

The 8.0 a.m. residential train, St. Fillans to Glasgow, has been accelerated by the withdrawal of stops, and an increase in the speed, and it now reaches Glasgow (Buchanan Street) at 10.25 a.m., Edinburgh (Princes Street) at 10.40 a.m.

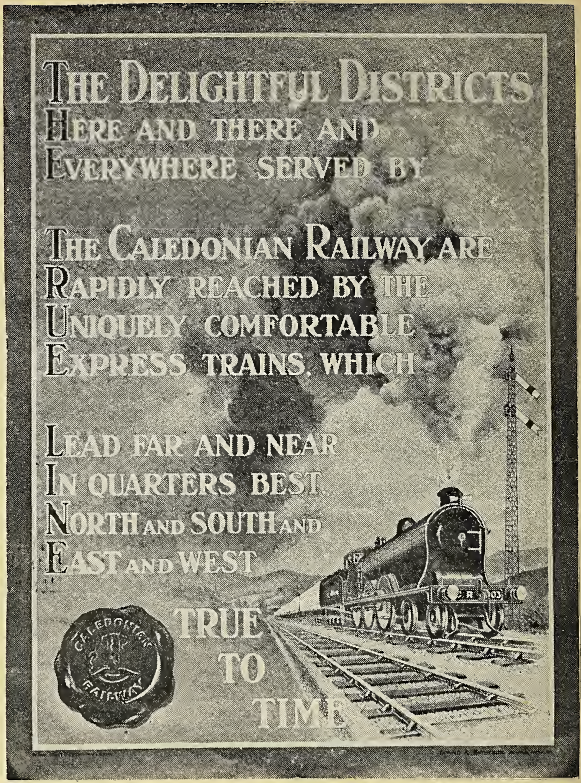
A new train will leave St. Fillans for Stirling at 11.15 a.m., where it will connect with the up midday corridor express for London (Euston), besides affording an additional service to Edinburgh and Glasgow, arriving in these towns at 2.24 p.m. and 2.0 p.m., respectively.

R.M. July 1902

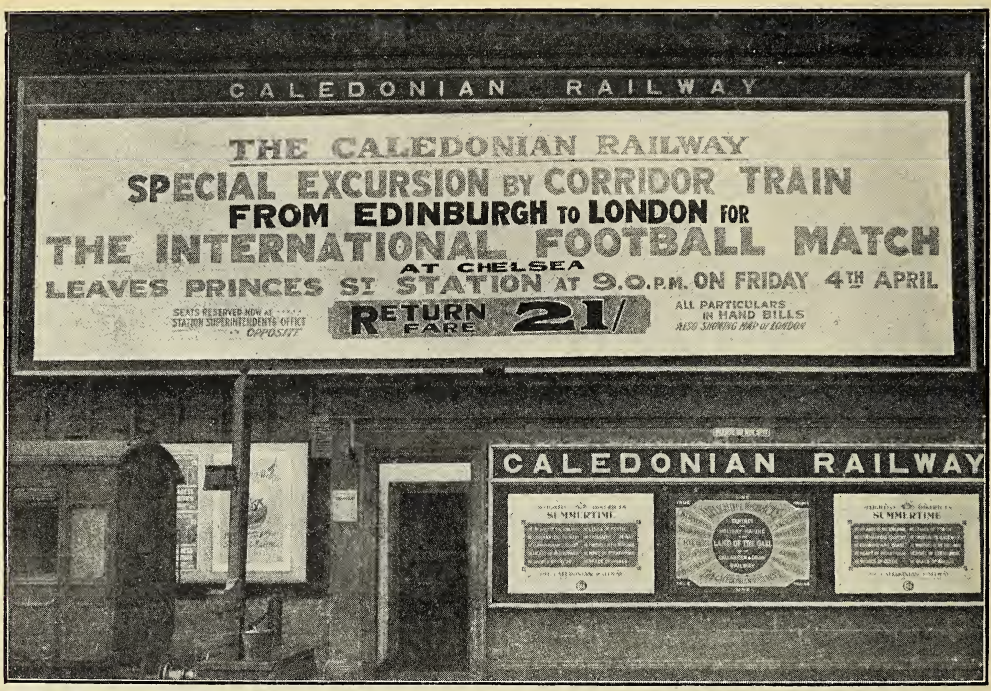
In connection with the Irish International Exhibition, which is being held at Dublin until October next, the Caledonian Railway is issuing cheap tourist tickets and arranging cheap excursions to take place at frequent intervals. There is a splendid service from Glasgow (Central), Edinburgh (Prince's Street), and all Caledonian Railway stations, to Dublin by the following routes:—*Via* Carlisle, London and North-Western Railway and Holyhead; *via* Lockerbie, Dumfries, and Larne; *via* Greenock and "Laird" Line and "Duke" Line steamers; *via* Ardrossan and Messrs. G. and J. Burn's steamers; and *via* Kirtlebridge and Silloth. In addition to the Irish trips, the Caledonian Railway will, on June 15th, inaugurate a grand circular tour between Glasgow, Edinburgh, and the Island of Arran, by the steamer *Duchess of Rothesay*, going *via* Gourock or *via* Wemyss Bay, and returning by the new turbine steamer *Duchess of Argyll*, *via* Ardrossan, or *vice versa*. The fares for the circular trip will be extremely low.

* * *

The Caledonian Railway announces popular Saturday afternoon excursions from Aberdeen and Stonehaven to Brechin and Edzell, every Saturday from 1st June, 1907. The return fares, third class, from Aberdeen and Stonehaven to Brechin is one shilling and sixpence, and to Edzell two shillings. The train leaves Aberdeen at 1.50 p.m., and Stonehaven at 2.15 p.m., arriving at Brechin at 3 p.m., and at Edzell twenty minutes later. The return train leaves Edzell at 8 p.m., Brechin at 8.20 p.m., and reaches Aberdeen 9.35 p.m. For this delightful run, which no visitor to the district should miss, a train of the most modern carriages is provided to ensure the comfort of passengers. Descriptive of the trip an excellent illustrated booklet, written by Mr. W. D. Smith, a relief clerk in the service of the Caledonian Railway, is being distributed. The booklet is entitled, "Off to the Grampians for an Afternoon."

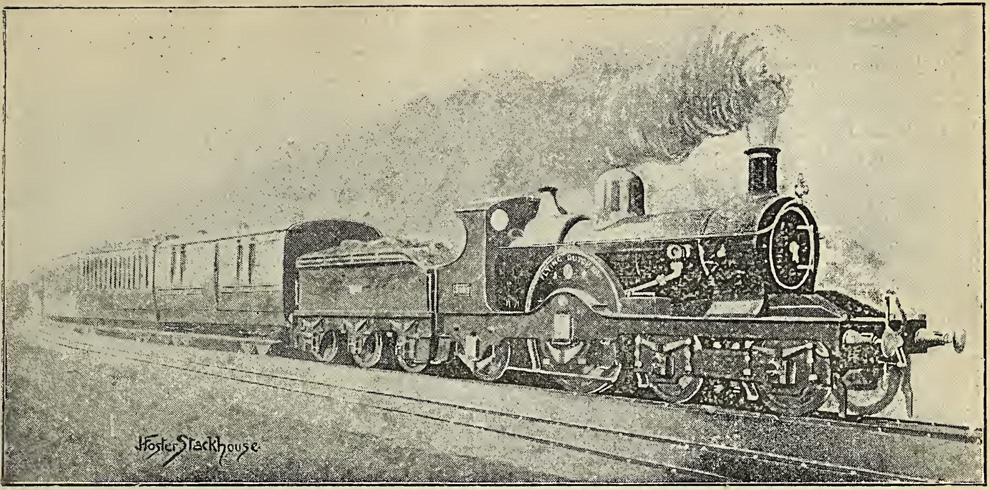


R.M. June 1907


CALEDONIAN RAILWAY
THE CALEDONIAN RAILWAY
SPECIAL EXCURSION BY CORRIDOR TRAIN
FROM EDINBURGH TO LONDON FOR
THE INTERNATIONAL FOOTBALL MATCH
AT CHELSEA
LEAVES PRINCES ST STATION AT 9.0 P.M. ON FRIDAY 4TH APRIL
SEATS RESERVED NOW AT STATION SUPERINTENDENTS OFFICE OPPOSITE
RETURN FARE 21/
ALL PARTICULARS IN HAND BILLS ALSO SHOWING MAP OF LONDON
CALEDONIAN RAILWAY
SUMMERTIME
SUMMERTIME

The Caledonian Railway advertised the special excursion bookings and trains to London from Scotland in connection with the recent International Football Match by means of mammoth posters, 42 ft. wide and 10 ft. 6 in. deep.

R.M. JA
1898



SOME RAILWAY MARVELS

II.

By Charles Rous-Marten

STARTING upon the second division of my subject, I wish to make it clear that I deal with performances that are not merely excellent but remarkable. Of merely excellent performances the number is so great that space would fail me if I attempted to describe them all. These I may treat on another plan and on a future occasion.

For the present, I shall refer only to runs which, when all the circumstances, including roads, gradients, curves, and relative engine-power, are taken into account are so exceptionally good as to deserve inclusion in a list of railway marvels. Also I desire once more to state emphatically that my remarks will have reference to Great Britain only. Further, I may remind my readers that runs whose sole merit is swiftness do not come within the scope of the present section. In accordance with my invariable practice, all loads mentioned are exclusive of engine and tender.

After carefully reviewing a portentously long list of fine performances on all the leading railways of Great Britain, I am forced once more to the conclusion that I have nothing in all my experience, wide as it has been, which in every respect equals the work done by that wonderful 1.54 a.m. Caledonian train from Carlisle, to which I have referred in a previous article. Its timing, 55½ miles an hour, including stoppages, from Carlisle to Forfar, 183¼ miles, stopping at Stirling and Perth, would have been extraordinarily fast even had the road been a dead level, or as easy as those from Paddington to Didcot, or Doncaster to York. Over one of the severest roads on which express trains are run in the whole kingdom, the timing itself was a genuine marvel. But it was no mere "paper" timing. In ordinary circumstances the booked time was almost always improved upon to a substantial extent. Again, the booked speed would have been most exceptional had the loads been as light as those of some long-famous expresses which only a few years ago were deemed marvellous because they averaged fifty-four miles an hour from start to stop on one relatively easy length. But in this case the loads were never really light; indeed, usually were fairly heavy. I never knew them to be less than 140 tons behind the tender, which would be equal to a train of fourteen coaches on the southern English lines, and they were generally much more.

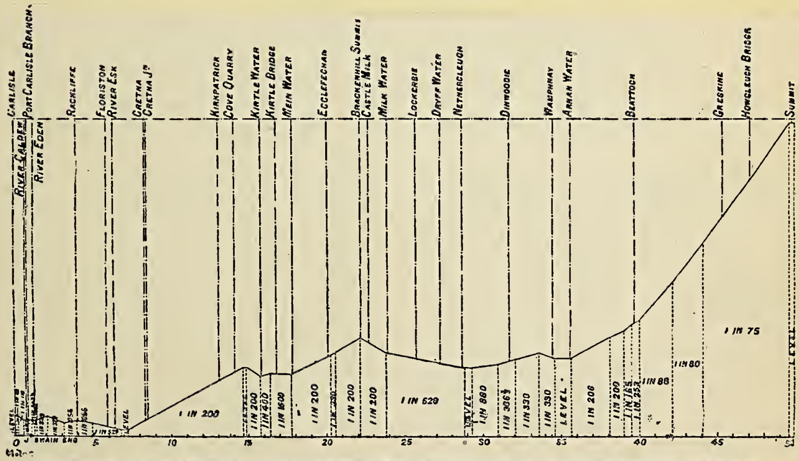
In the two cases which I select as the most notable of the railway marvels that have come under my own cognisance, the loads were respectively 161 and 170 tons. That is to say the trains would have been reckoned as sixteen or seventeen coaches on the southern railways. Now these trains covered the 117¾ miles from Carlisle to Stirling in 116min. 53sec., and 117min. 40sec., or at the speeds from start to stop of 60.5 and 60.1 miles an hour. It will no doubt be said: "Oh yes, but of course the fast time was made on the long downhill stretches after the Beattock Summit was passed." Not at all. This is indeed the point on which I desire now to lay special stress, as I have not touched it in previous articles on the subject. From Carlisle to Beattock Summit each train maintained the average speed—within a small fraction—at which it was booked for the entire distance, over fifty-six miles an hour. That is to say, Mr. J. F. M'Intosh's engines drew these loads of 161 and 170 tons respectively, a distance of 50 miles—34 being uphill, including 6 at 1 in 75; 2 at 1 in 80; 2 at 1 in 88—in 53½min., or at the average rate of 56.1 miles an hour, and while doing so climbed a height of over 1,000 feet.

Now I should like to remark here in passing that I have no prepossession in favour of the Caledonian line, or of any railway or engine or designer. I made my journeys of investigation quite independently and unhampered, to observe for myself, and with the understanding that the results I might obtain would be publicly and impartially stated. But, looking thus impartially at the results just noted, I am forced to the conclusion that they surpass in merit any that have ever come under my personal notice. They embody in a high degree all the points of merit specified at starting—speed, weight-pulling, and gradient-climbing. Here we have loads which would be reckoned at sixteen and seventeen coaches on the southern railways. We have 50 miles of road, 34 of which are on ascending gradients, the last six being at 1 in 75, two at 1 in 80, two at 1 in 88, and the rest mostly at 1 in 200. And this was run from the start at the average rate of over 56 miles an hour. If anything better than this has been done I should very much like to hear of it.

It may be further noted that the speed was maintained steadily at a minimum rate of 36 miles an hour all the way up the long grade of 1 in 75, with those loads of 161 and 170 tons, and that the respective times occupied over the 50 miles were 53min. 30sec., and 53min. 33sec., which is singularly close work. The engines, though both of the same ("Dunalastair") class, were different ones, and had different drivers. The secret of the excellent work unquestionably was that having abundant boiler power, the drivers were not afraid to give the engines plenty of steam. I direct attention to the profile of that part of the line on which these admirable performances were achieved (see page 37).

Having maintained over the heavy part of the road the average prescribed for the whole run, the trains were able to utilise the remaining 68 miles of easy road to cut under time considerably, and so in spite of the five service slacks at junctions, those 68 miles were run in 63min. 20sec., and 64min. 10sec. respectively. The rush from Beattock Summit to Carstairs, 23½ miles in 19min. 13sec.—19 miles of the 23½ being downhill—was in its way equally remarkable, especially seeing that the length was entered upon at 36 miles an hour after passing the Summit, and that the train was slackened to a similar rate approaching Carstairs. The continuations of the journeys onward to Perth by the same engines and loads were also noteworthy. The same closeness of result was present, the slightly lighter train (161 tons) taking 34min 44sec. for the 33 miles, and the other (170 tons), 34min. 46sec. This run, in a large measure, reproduces the characteristics of that to Stirling, there being a severe climb followed by a downhill stretch, but the proportion of ascending gradient is much greater, there being a virtually unbroken climb for seventeen miles, to Crief Junction, six miles being very severe, some as steep as 1 in 73. The subsequent run to Forfar, although phenomenal in its published timing and having a seven-mile climb to start with, being made with a far smaller load, presented no difficulties.

Another experience on the Caledonian is, I think, fairly entitled to a place in my list of marvels. One of Mr. D. Drummond's 6ft. 6in. coupled bogie engines (cylinders 18 by 26) left Symington with the afternoon up "diner," consisting of twenty-two coaches, a total load of over 320 tons behind the tender. It climbed the seventeen miles to the Summit in 22min. 13sec. from the start, and made the whole run of 67 miles to Carlisle with that enormous load in 72min. 57sec. The entire distance from Carstairs (73½ miles) occupied only 81min. 35sec. running time, with an intermediate stop at Symington, 30 miles out of the 73½ being uphill, several miles at 1 in 100, while the descent of the steep and curved Beattock Bank had to be made cautiously at a comparatively slow speed. The average speed from Symington to Carlisle, start to stop, was just 55 miles an hour, with a load of over 320 tons, 25 miles of the distance being uphill. On another day, one of the late Mr Lambie's engines, of similar dimensions and design to that last named, taking the same train, made the run from Symington to Carlisle in 71min. 30sec., the load being 260 tons.



CALEDONIAN RAILWAY—GRADIENTS FROM CARLISLE TO BEATTOCK SUMMIT

Perth General Station on the *Sawbath*.

In the September issue of the Railway and Travel Monthly last year we published an exhaustive article, copiously illustrated, upon the working of the large passenger traffic on week-days during the summer at Perth General Station. We now supplement the article by describing the work on Sundays, on which days, even in summer, the traffic through Perth General Station is comparatively light. The 8.48 p.m. from Carlisle and the 10.0 p.m. from Glasgow both run on Saturday nights, consequently the 12.50 a.m. trains to Dundee and Aberdeen run as on other mornings from Perth. The former is five minutes later in reaching Dundee (West) on Sundays, owing to a couple of intermediate stops. The Highland Railway's 12.55 train to Inverness does not, however, run.

The Sunday trains proper are few in number, and commence at 7.45 a.m., when a North British Railway slow departs for Edinburgh. At 8.23 the West Coast express, which leaves Carlisle at 4.30 a.m. and London (Euston) at 9.0 p.m. the previous night, arrives. It brings through carriages for Aberdeen received off the 6.25 a.m. from Edinburgh (Princes Street) at Larbert, and a connection is also given from Glasgow at Coatbridge by the 6.5 a.m. from the Central Station.

Eight thirty-one sees a local express from Dundee (West) come in, and 10 minutes later the 7.30 a.m. North British Railway express from Edinburgh (Waverley) arrives, bringing through coaches off the 9.30 p.m. from London (St. Pancras), and also a sleeping car off the 11.30 p.m. *ex* King's Cross.

Eight forty-five sees the West Coast train leave for Aberdeen, at which city it is due 2¼ hours later. Shortly after its departure the 11.45 p.m. from Euston sleeping car express (5.43 am. *ex* Carlisle) comes in at 9.0. This train attaches at Coatbridge through carriages for Aberdeen off the 7.5 a.m. *ex* Glasgow (Central). The "sleeper" for Dundee is sent down on an express from Perth at 9.15, which, like the 6.10 a.m. week-day train, departs from the General Station up main platform. The Aberdeen train leaves at 9.5, and is due in the Granite City at 11.15.

The two Highland Railway trains, 9.10 and 9.30 out of Perth, are both semi-fasts, *via* Forres, and reach Inverness at 1.50 and 2.30 p.m. respectively. A North British Railway slow train from Edinburgh, due in Perth at 10.12 a.m., completes the forenoon's work.

* * *

Two Curious Trains.

Corresponding South-going trains to the above fall to be recorded in the afternoon. At 3.33 p.m. the Highland Railway's Up Sunday Mail passenger comes in, having left Inverness at 10.10 a.m. and travelled *via* Forres. The connecting train from the North starts from Wick at the astonishing hour of 2.30 a.m., and reaches Inverness at 9.50 a.m. Next to arrive is the 3.15 p.m. from Dundee (West), due at 3.50, and connecting with the 1.10 p.m. (Caledonian Railway) Limited Mail, from Aberdeen, which reaches Perth at 3.53. The latter train divides here, and runs forward at 4.7 and 4.20 p.m. respectively, the first portion for Carlisle (arrive 8.33) and London Euston (arrive 3.50 a.m.); the second for Glasgow (Central) and Edinburgh (Princes Street), where the arrival times are 6.25 p.m. in each case. Sleeping cars are run from Aberdeen to London, also a dining car from Perth to Carlisle, on the first portion—a curious combination not very often met with in this country.

The North British Railway's Edinburgh express leaves at 4.10 and runs to Hilton Junction between the above two trains of the Caledonian Railway. At 4.20 a Caledonian Railway fast train runs down to Dundee, departing from the Down Dundee platform after the usual manner; and 4.30 sees a North British Railway slow train leave for Edinburgh. The day's work is concluded by the arrival at 7.16 of a similar train from Edinburgh (Waverley); and the Perth General Station settles down thereafter to a longer spell of leisure than usual; no trains falling to be dealt with until 5.8 on Monday morning.

* * *

TRAIN-MILE EARNINGS ON THE CALEDONIAN.

Excluding the trains run for other companies, the earnings per train-mile of the Caledonian Railway passenger traffic was for half-year ending January 31st last 43.77d., compared with 43.96d. for the corresponding period of previous year; and the merchandise and mineral traffic receipts per mile were 88.05d., compared with 82.97d.

* * *

R.M. April 1904

It is with most sincere regret that we chronicle the extremely sudden death (from heart trouble) of Mr. William Patrick, the general manager of the Caledonian Railway, which took place on the morning of January 14th, two hours after his arrival in Glasgow from London. Mr. Patrick had only occupied his present position about a year, but he was widely known as a most capable railway officer.

So greatly, indeed, were his abilities recognised in the railway world, that he had on several occasions been offered (and refused) the general managership of other railways. On one occasion, upon the retirement of an experienced general manager, that gentleman, and a deputation of his directors, waited on Mr. Patrick and asked him to accept the general managership of the line in question on his own terms. But the directors of the Caledonian Railway had already secured the services of Mr. Patrick as successor to Sir James Thompson, when the latter retired. This he did a year ago, and Mr. Patrick then entered into the position for which he had been selected years previously.

The Railway Magazine for November, 1900, contained a portrait and sketch of Mr. Patrick's career.

In conclusion we may state that Mr. Patrick was a poet of no mean order, and amongst his friends it has been long recognised that the gain to the railway world of a capable officer in the person of Mr. Patrick was a loss to Scottish literature of a poet.

❦

Mr. Robert Currer, western district superintendent of the Caledonian Railway, has just retired, and the following new appointments have been made in consequence: Mr. Robert Millar, assistant district superintendent (unattached), has been appointed superintendent for the western district, in succession to Mr. Currer; Mr. Andrew Brand, General Manager's Department, and Mr. Robert J. Patrick, of the Parcel Department, have been appointed assistant district superintendents (unattached); whilst Mr. Thomas Anderson, chief inspector, has been appointed assistant mineral superintendent, with headquarters at Motherwell.

❦

R.M. FEB 1901

Reducing Directors' Fees on the Caley.

Some people affect to believe that railway directors are as keen after fees as any pettifogger is greedy for "costs." Amongst railway nationalizers of this calibre, the view is openly expressed that the failure to completely amalgamate the undertakings that has been a feature of the working agreements amongst railways of recent years, is due to the fact that amalgamation meant reduction in the number of directors, with the consequent loss of emoluments by those no longer required.

Against these statements we have the recent decision of the Directors of the Caledonian Railway to reduce their number from fourteen to twelve, the maximum number of directors being fixed at fifteen by the Caledonian and Scottish Central Railways Amalgamation Act, 1865, and provides that, with due notice given, that number may be reduced by vote of a general meeting of the shareholders to not less than twelve. Since the amalgamation with the Scottish Central Railway down to the March half-yearly meeting the Board had consisted of fourteen directors, but, as stated above, the Directors then decided that a Board of twelve members will be quite sufficient for the administration of the general affairs of the Company, and that a slight economy can be made under the head of Directors' fees. There was in March, owing to the lamented death of Mr. Tod, a vacancy on the Board, which was not filled up, and the same course will be adopted on the occurrence of the next vacancy from death or resignation.

The above statement was sufficient to call forth the sneering remark from the irreconcilables, that the remaining directors were not filling up the vacancy as they would, by omitting to do so, have more directors' fees to divide amongst themselves.

Here, again, these measures of other people's actions by the standard of their own proceedings were in error, for the remuneration of the Board of fourteen directors, which was fixed by resolution in March, 1896, at £5,250 per annum, is now reduced by one-fourteenth, and will, when another vacancy occurs, be further reduced by another one-fourteenth, the directors thus giving up £750 a-year of their fees for the benefit of the shareholders.

* * *

RTM MAY 1910

The Caledonian Railway is the first of our iron roads to employ women as police. This railway has recently secured the services of a number of women who have been trained for the Women's National Police Service and who have had practical experience of work among women in munition and military centres, so that they will be fully qualified for the new duties with which they are to be entrusted. In these days of strict economy in railway operation it would be interesting to have particulars of the duties that will be performed by the Caledonian Railway policewomen.

* * *

RTM Nov: 1920

The Caledonian Railway, in doubling the line from Eglinton Street station, has effected a great change within a few months. The work is now practically at an end, and the full roadway in Eglinton Street will shortly be available for traffic. A sandstone wall is being erected to enclose the railway property. Crawford Street, which had to be shut up for a time, is being reconstructed. A new bridge has been built across the line, and entrance to the station may be made from Crawford Street. The street wall has been constructed on the south side of the street, and when the wall on the north side is completed the roadway will be opened for traffic.

* * *

RM JULY 1908

ABOUT half-past five o'clock on August 13th a Leith goods train by some accident left the rails on the Caledonian Railway at Carnwath, with the result that both lines were blocked. A breakdown gang was at once employed, and single-line working was opened between eleven and twelve. The result of the block was that all the south traffic was worked by Holytown, causing a delay to the English trains of about an hour.

The Board of Trade have confirmed the Order authorising the construction of a light railway by the Caledonian Railway Company between Elvanfoot Station and Wanlockhead, in the counties of Lanark and Dumfries.

RM. SEPT: 1896

* * *

ON the occasion of their recent visit to Edinburgh, the King and Queen, accompanied by the Prince of Wales, travelled north from Euston to Barnton, on the Caledonian Railway, where the Royal train was stationed for two days. On the day their Majesties spent driving through the capital amongst their Scottish subjects, from whom they received a warm welcome, the Royal train (London and North Western stock) arrived at Princes Street station shortly after 10 a.m., drawn by Caledonian engine No. 924, with No. 933 as pilot engine, both of the 4-4-0 type. After the Royal party left the station the public were permitted to enter the platform enclosure to view the handsome train, which consisted of twelve vehicles, and the privilege was greatly appreciated and taken advantage of by many. The Royal party left Princes Street Station at 4 p.m. and returned to Barnton, proceeding thence south to Euston overnight. During the time the Royal train was stationed at Barnton the branch service to and from Edinburgh was withdrawn, but the Caledonian Railway provided a service of motor buses between Craigleith and Barnton for the benefit of season-ticket holders desirous of travelling from and to the city.

* * *

RM. JAN: 1919

The Caledonian's *Railway* Bookmarker.

SEVERAL railways have brought out book-markers, which passengers who read whilst travelling must find extremely useful. The best we have seen is one issued by the Caledonian Railway, and contains just the kind of information that delights the heart of *railwayacs*, and cannot fail to interest travellers on the Caledonian Railway. On one side of the book-marker is an excellent reproduction of the Grampian express passing the Stonehaven golf course, whilst on the reverse is a gradient profile of the Caledonian Railway from Carlisle to Glasgow, showing the respective heights of Carlisle, Beattock summit, and Glasgow above sea-level. A table to show speed of trains, method to calculate same, and particulars of the longest and fastest runs on the Caledonian Railway are also given. This information cannot fail to be an excellent advertisement. The traveller will naturally be interested to know at what speed the heavy train will ascend the formidable Beattock bank, and by means of the speed table and his watch he will be able to find this out during the ascent. So powerful are the Caledonian Railway's locomotives, that passengers cannot fail to be impressed by the feat performed, and to talk about it to their friends when relating incidents connected with the journey. Since the information contained in the book-marker will have enabled passengers to time the train, they will take a personal interest in the running, and relate how they "timed the train and found it travelling at so many miles an hour," explaining that to do so the train had to travel a quarter of a mile in — seconds (this information being obtained from the book-marker, although the narrator will probably not mention that fact). Both Mr. R. Millar, the general manager, and Mr. G. Calthrop, the general superintendent, are to be congratulated upon this excellent idea for a book-marker.

* * *

R.M. MAY 1906.

THE Board of Trade report on the collision between a train and an engine at rest at Milnwood Junction, on the Caledonian Railway, on 27th December last, whereby seventeen people were injured, states that the collision was due to neglect of duty or breach of rules on the part of several railway servants. One signalman allowed the light engine to proceed as a banking engine without authority. Another signalman overlooked block signals from Jerviston relating to the light engine, while the driver of the light engine broke the rules in not sending his fireman to Milnwood Junction signal box, when he found himself detained at the box. Had any one of these men performed his duty in a proper manner, the collision would not have occurred. The report further states that if, as one of the signalmen said in evidence, it is the custom to send engines forward behind mineral trains without being coupled, it indicates an habitual disregard to block rules, and is tantamount to permitting two trains to be in a section at the same time. R.M. May 1906.

* * *

ON Tuesday, November 15, a tablet to the memory of the Caledonian Railway staff who fell in the war was unveiled at Glasgow Central station with suitable ceremony. R.M. 12-1921

* * *

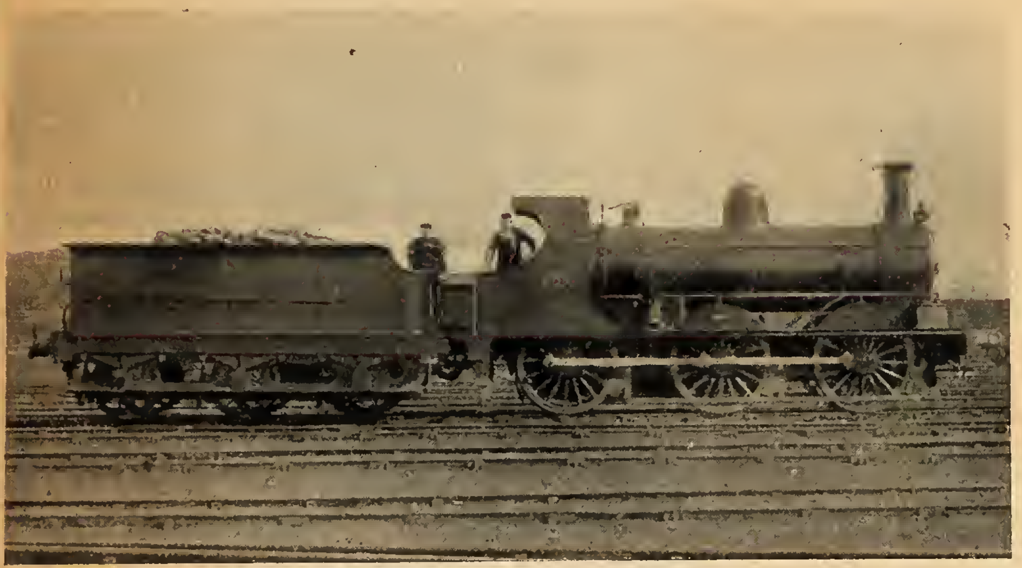
non-stop train from Wakefield to Manchester is now accelerated to 58 min., and usually covers the distance well under booked time. There is a Halifax–Manchester 42 min. timing (32½ miles), and one quite surprising booking, with the 2.10 p.m. *ex.* Liverpool, from Manchester to Brighouse (34¼ miles) in 41 min. The original timing was 42 min., but I have never been fortunate enough to secure an unchecked run with the train. It used to be regularly worked by the "1093" class, often by No. 1112, the engine which Mr. Hoy converted into a four-cylinder compound, so like the creations of Crewe that, as a Lancashire and Yorkshire Railway driver once remarked to me, "She would almost turn into a North-Western shed." The Yorkshire road is very hard, with an 18 miles' rise from Manchester to the Walsden summit, commencing at 1 in 77 and 65 out of Victoria, and continuing at 1 in 150 for some miles. On the other side there is a long descent all the way to Wakefield, part at 1 in 183, but most of it at 1 in 330 and 440.

The Manchester and Southport trains take some heavy loads and are booked at express speed; they use the Liverpool road, with all its difficulties, for the first 16 miles, and have a severe service slack to observe through Wigan. When last I travelled on the 5 p.m. from Manchester, booked to reach St. Luke's (34⅜ miles) in 44 min., 1397 kept time easily with 205 tons; and in the opposite direction there are expresses booked from St. Luke's Road to Salford at 51·7 miles per hour, while 22 min. used to be a regular start to stop timing for the 17¼ miles from Wigan to Salford, and was always kept. On the Blackpool line the timings are easy, but very heavy loads are taken on the morning and evening trains, and there are numerous service slacks. Several expresses use the Liverpool road for 13½ miles out of Manchester, and then cross by a very sharply graded spur to join the Preston line near Blackrod, and there has been for years a non-stop Manchester to Preston train by this route (31¼ miles) in 42 min., which habitually makes the run in 40 min. or less. Of the Blackpool trains proper, the hardest is probably the 5.10 p.m. from Manchester, allowed 61 min. to Lytham (44¼ miles) with a load seldom under 230 tons. I have frequently found the train improve considerably on its schedule, but the runs are not of sufficient interest to reproduce here.

So very few details of the performances of the 903 or "Cardean" 4–6–0 type on the Caledonian Railway have appeared in print, that I am glad to be able to give a few specimens of their work. There are few railways on which the 4–6–0 class is being so extensively used for express work as the Caledonian, and it is now no unusual thing to be taken from Carlisle to Glasgow by a "Cardean," or by Nos. 49 or 50, thence forward to Perth by one of the "Sir James King" or 908 batch, and again to be entrusted to a "Cardean" for the run from Perth to Aberdeen. There has been a tendency during the last few years to reduce the loads hauled between Carlisle and Carstairs, by the regular division of several down trains, notably the 10 a.m. and 11.50 p.m. from Euston; but the time table still provides plenty of work for the locomotive department, and West Coast stock is notoriously heavy. On the down journey, I tried first the Birmingham express, then booked out of Carlisle at 3.32 p.m., and allowed 99 min. for the 73½ miles to Carstairs, with stops at Lockerbie and Beattock. The engine was No. 907, and the load from Carlisle 295 tons, increased to 320 tons at Lockerbie. We got away quite smartly, and passed Gretna (8½ miles) in 10 min. 51 sec. from the start, speed rising to 64·2 miles per hour on the short fall after Floriston; up the 7½ miles of 1 in 200 from the 7th mile-post our minimum was 46·1 miles per hour, and on the similarly graded rises to Ecclefechan and to the 22nd mile-post we never dropped below 50. We touched 63·5 on the fall at 1 in 528 before Lockerbie, and stopped at that station in 30 min. 28 sec., 25¾ miles. From Lockerbie to Beattock, over the 14 miles of very broken ground, which finishes with a four miles' ascent at 1 in 206 and 200, we took 16 min. 43 sec., never falling under 50 miles per hour before the slack for Beattock, and running at slightly over 60 for several miles; and the 10 miles' climb from Beattock station to the summit was negotiated in 19 min. 34 sec., with a bank-engine assisting in rear. We took 23 min. 11 sec. for the 23½ miles from the summit to the Carstairs stop, just attaining 72 miles per hour at Lamington, but running most of the distance at a very moderate rate. The whole run was made in 4 min. under time, taking no account of "overtime" at the two intermediate stops, and although with assistance up Beattock the booking becomes comparatively easy, 907 acquitted herself very

THE SOLWAY JUNCTION RAILWAY.

IN 1864 an Act was passed for the construction of a line from the Caledonian Railway at Kirtlebridge to Brayton Station on the Maryport and Carlisle Railway, a distance of 21 miles. The main object of this line lay in the facilities it would offer for bringing coal, iron, etc., from the northern lines to the south and west, thus avoiding Carlisle. In the construction was entailed the necessity of building a very long viaduct over the Solway Firth which, not being constructed of a very massive design, restricted considerably the loads that could safely be carried across, and as time has proved, the venture never attained the success anticipated. In 1873 the portion of the line from Annan to Kirtlebridge was sold to the Caledonian Ry. Co., which reduced the Solway Junction mileage to 16 miles. The entire rolling stock is provided by the "Caley," who also work the trains with their own locomotives.


SIX-COUPLED LOCOMOTIVE NO 381, CALEDONIAN RY.

The first engines in operation on the line were two built by Messrs. Neilson & Co., in 1868, the makers' numbers being 1388 and 1389, and the Caledonian numbers 542 and 543. These engines were of light construction and had six-coupled wheels of 5-ft. diameter and inside cylinders, they were built for the London, Chatham & Dover Ry., but, not being delivered to contract time, they were thrown on the builders' hands A typical Connor cab and chimney were fitted, we believe, when they entered the C.R. service, and they were the first inside cylinder engines of the road. After running for 34 years in their original condition Mr. McIntosh has rebuilt them with larger boilers and his standard mountings, and they are shown in the accompanying photograph as now running. They were, previous to rebuilding, placed in the duplicate stock and numbered 542A. and 543A but have now been replaced into the ordinary stock and numbered 381 and 382 respectively. Although stationed in the Carlisle district they stand at Kirtlebridge and come to the border city periodically for repairs, etc. The passenger traffic over the line is very limited and is also worked by the older four-coupled passenger engines of Connor's design.

In January, 1881, after a frost of exceptional intensity, a portion of the Solway Viaduct was carried away by the ice, resulting in the destruction of a part of the viaduct and a complete suspension of through traffic for nearly three years whilst the reconstruction work was proceeding. This unfortunate occurrence was a blow to the prosperity of the line and when the weather is rough now traffic has to be suspended to avert the possibility of a similar disaster to that which happened on the Furness Railway early in the present year.

The Caledonian Co. work the line for 40 per cent. of the profits, the Solway Co. maintaining the road.

L.M. Sept: 26th 1903.

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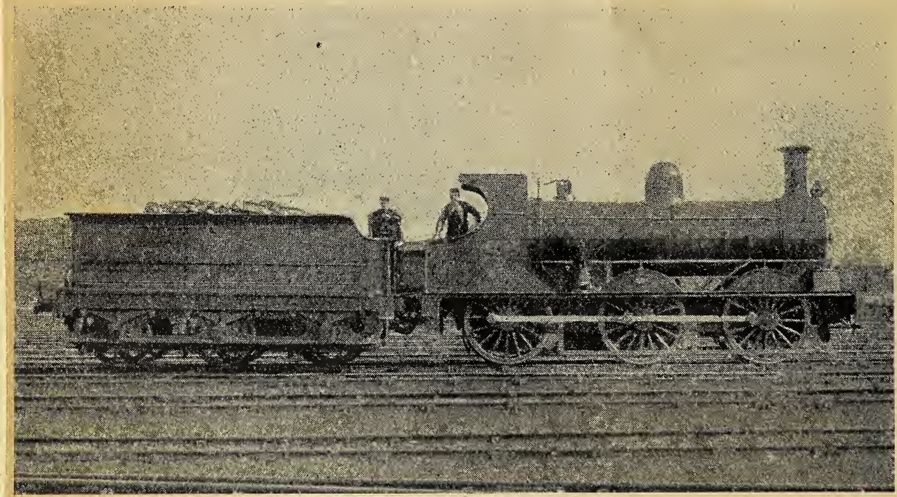

Six-coupled Locomotive No. 381, Caledonian Ry.

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L.M. Sept: 26th 1903.

A Railway Contractor's Method of Enforcing Payment.

There recently died at Bournemouth Mr. James Ramsay, at an advanced age. He is believed to be the last survivor of those connected with the original Arbroath and Forfar Railway, a portion of which was opened as long ago as January, 1839.

Mr. Ramsay was station master at Arbroath from 1862 to 1890, when he retired from railway service. His long and intimate acquaintance with Mr. D. D. Buchan, of Bournemouth, has enabled the latter gentleman to publish many of Mr. Ramsay's interesting reminiscences of early days in the Arbroath district. One of these, which concerns a length of line now a portion of the Caledonian Railway's main-line to Aberdeen, we reproduce.

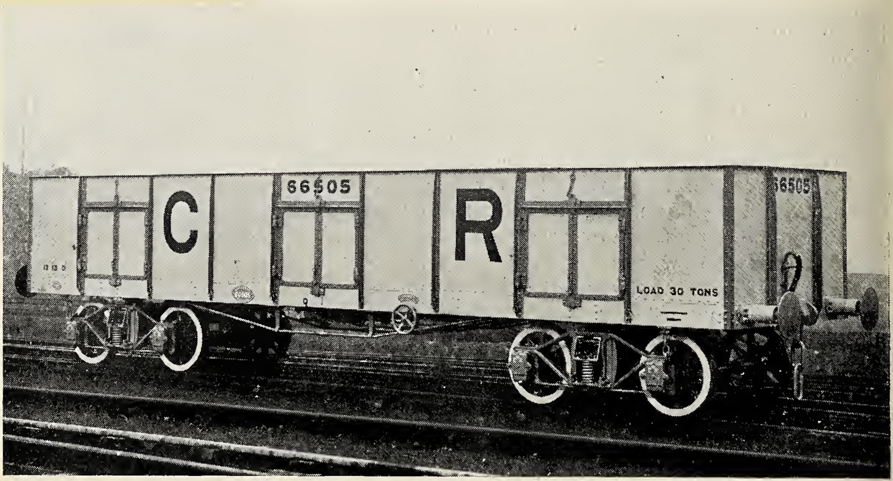
"On the opening of the section of the Scottish North Eastern Railway from Friockheim Junction to Limpit Mill—or 'Lampit,' as locally known—Mr. Ramsay was put on the staff at Fordoun station, and on the day the various stations on the section were manned an unusual incident took place. A special train was run from the south, picking up the required men, and then putting them down at the newly-completed stations. On the train nearing the big wooden viaduct which had been constructed over the North Esk Valley, south of Fordoun, the driver was astonished to see the bridge-contractor's men standing on the railway and on an adjoining hillock, waving a red flag. He stopped, and the contractor said he had not been paid for building the viaduct, and would not allow the train to cross until he had been paid all that was due to him. To enforce his contention he had taken up some of the rails. Arguments and expostulations were in vain, so the men had to get out and make their way to their respective stations in the best way they could. The contractor was paid in full after four or five days' delay. Traffic was then begun, but the incident caused considerable annoyance as well as local amusement."

* * *

FROM A BOOKLET PUBLISHED BY THE LONDON AND NORTH WESTERN AND CALEDONIAN RAILWAYS.

THIRTY-TONS BOGIE WAGON, CALEDONIAN RAILWAY.

THE illustration shows one of a number of 30-tons bogie wagons which Messrs. Hurst, Nelson & Co., Ltd., are at present building at their Motherwell works. As will be seen, the wagons are built entirely of steel, and are of ample capacity for carrying the full load of 30 tons of coal. The inside dimensions of the wagons are 34-ft. 11$\frac{5}{8}$-in. by 7-ft. 11$\frac{5}{8}$-in. by 4-ft. 4-in., and a special feature is the low tare in proportion to the carrying load. In addition to the hand screw brakes, which can be operated from either side, the wagons are also equipped with the Westinghouse brake.



THIRTY-TONS BOGIE WAGON, CALEDONIAN RY.

Messrs. Hurst, Nelson & Co., Ltd., have recently made large additions to their hydraulic plant, and are, therefore, enabled to make a first-class job of this type of rolling stock, all the rivets with few exceptions being put in by machinery.

Loco Mag: 12/2/1904

The Wilsontown Branch, L.M.S.R.

THE notes published in the September-October issue (p. 309) of *The Railway Magazine* on the Wilsontown branch of the L.M.S.R., which diverges from the Carstairs-Edinburgh main line at Auchengray, 6¼ miles north-east of Carstairs, have brought some further information from Mr. John S. Brownlie, who has visited the branch recently. The spur from Wilsontown Junction West, on the branch, to Wilsontown Junction North, on the main line, once used for through running to and from Edinburgh, has now been singled, and the exits are controlled by shunt signals only; at present it is used for wagon storage. The branch is still double from the Auchengray direction as far as Haywood, where the single-line section begins at a small signal cabin, which has replaced the old and much more elaborate signalbox. The latter survived the fire which destroyed Haywood Station some years ago, and most of it is still standing. The mineral extension to Kingshill is still in existence, though our correspondent considers it curious that the pit here was not served from the more nearly adjacent Blackhall junction on the Morningside branch of the late North British Railway. Further towards Edinburgh from the Wilsontown junctions was Tarbrax junction, which is now disused.

Carnforth Locomotive Shed

THE new locomotive shed of the L.M.S.R. at Carnforth, completion of which was delayed by war conditions, has now been brought fully into use, Mr. Ian S. Pearsall writes; due to overcrowding of the old L.N.W.R. shed it has been in partial use for over a year past. The old Midland shed, which is some distance from the station, on the east side of the West Coast main line and the main Kendal road, has now been closed, with the signalbox giving access to the Midland locomotive yard.

North-West Junction, Derby

REFERRING to the reply given on p. 318 of the September-October issue under the heading "A Junction at Derby," Mr. S

provide speed, but in association with acute discomfort !

An Early Caledonian 2-4-0

OLDER Scottish readers will be interested in the photograph which we reproduce above, showing one of the 2-4-0 locomotives of the late Caledonian Railway, designed by Mr. Benjamin Connor and built in 1863. They and their numerous successors all had a strong family likeness; they were divided into groups with 6 ft. 2 in. and 7 ft. 2 in. driving wheels, and No. 26 belonged to the former. All the Connor characteristics are seen in this locomotive: sharply inclined cylinders let into the side framing, which was slotted to expose the crosshead; splashers with many

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able that no

stop is scheduled at Hertford, in order to improve connections from the north to the county town, or at Enfield. Despite greatly increased wartime traffic, apart from these two trains it appears that no greater use is being made than in peacetime of the Hertford-Langley Junction section, which, notwithstanding its double line, sees very few trains save when the main line is blocked.

Sep.Oct/44.

The Wilsontown Branch, L.M.S.R.

SOME interesting notes are to hand from Mr. K. Westcott Jones on the Wilsontown branch of the L.M.S.R., which leaves the Carstairs-Edinburgh line by a triangle immediately to the north-east of Auchengray station, 6¼ miles from Carstairs. The branch was opened in 1870, mainly to serve collieries and an ironworks to the west of the main line. Branch passenger trains usually start from a bay platform at Auchengray, and diverge ½-mile from the station on a 1 in 109 up gradient; after the direct Edinburgh spur has come in, the line continues as double track for 1½ miles to Haywood station. This was burned down some years ago and the new structure contrasts sharply with the almost derelict village that it serves, for water in the local pits caused them to close down, most of the population moving westward to Wilsontown and Forth. From Haywood the line, now single track, climbs at 1 in 100 for 1½ miles to Wilsontown, which is almost exactly 1,000 ft. above sea level. The town of Forth, with 4,000 inhabitants, is a mile south-west of the station, and it was proposed at one time to build a railway from Wilsontown to Forth, using part of the existing colliery line for the purpose, but the project did not materialise. There are several sidings at Wilsontown, serving the neighbouring colliery, and also an ironworks that is now derelict. After Wilsontown the branch, which from here carries mineral traffic only, climbs at 1 in 60 to the top of a bleak windswept moor, and finally makes an end-on junction, at a point marked by a white post, with the Coltness Iron Company's line to Kingshill No. 2 colliery, 3¼ miles from Wilsontown. At 2¼ miles from Wilsontown there is a branch to Climpy pit, which has been worked out, and the branch is now used for storing loaded coal wagons. The present passenger train service on the branch is somewhat curiously unbalanced. From Wilsontown on weekdays other than Saturdays, the 7.11 and 11.35 a.m., and 3.47 p.m. trains run to Auchengray only; the 6.16 p.m. to Auchengray continues as empty carriages to Dolphinton Junction, Carstairs; the 5.5 p.m. runs to Carstairs, and the 8.9 a.m. through to Lanark. On Saturdays the 12.30 and 3.57 p.m. both run through to Lanark, and the 6.40 p.m. runs to Carnwath. In the reverse direction the only through working from Lanark is at 5.57 p.m. on Saturdays, due at Wilsontown at 6.30 p.m.; on other days the 5.46 p.m. from Carstairs runs to Wilsontown, due at 6.7 p.m., but all the remaining workings are locals between Auchengray and Wilsontown only. The 5.46 p.m. from Carstairs is worked by a compound 4-4-0, usually No. 903, which returns on the 6.40 p.m.,

CALEDONIAN.

There are novelties to record in the matter of locomotive working. The West Coast trains other than those to and from Glasgow will be hauled by 4-coupled bogie engines, of which 5 new ones, viz., Nos. 923–927, have recently been put into service. These engines are modifications of the 140 Class, but embody several improvements; they will work the English expresses between Carlisle and Edinburgh, and also between Carlisle and Aberdeen. Those on the latter service will remain on their trains the entire journey of 240 miles, thus creating a new record in locomotive working, so far, at least, as Scotland is concerned. These engines in working the 8 p.m. *ex* Euston (2.17 a.m. *ex* Carlisle) will run to Perth (151 miles) without a booked stop. The coupled wheels are 6 ft. 6 in. diameter, the cylinders being 19 in. diameter by 26 in. stroke.

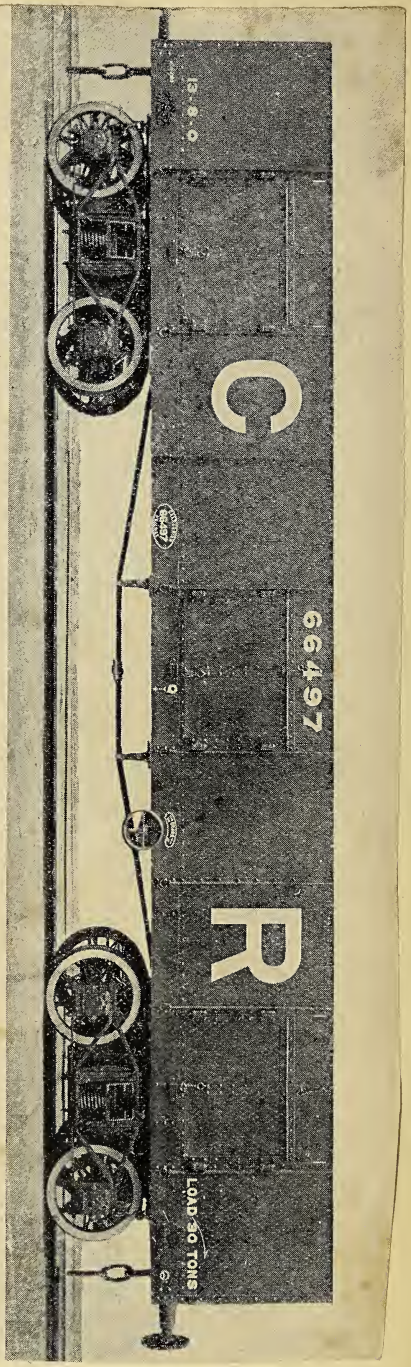
Bristolians will have an opportunity of seeing some down-to-date Caledonian Railway coaches.

Amongst others at present being turned out from St. Rollox are two 65 ft. corridor brake "Grampian" composites, with electric light, steam heating and lavatory equipments, to replace the two 50 ft. carriages on the Glasgow-Bristol service.

Five new 50 ft. third class bogie corridor saloons, with two compartments convertible into one by sliding door, fitted up in the style of, and built to run with, "Grampian" stock, are already in traffic, as also are six new 50 ft. bogie corridor brake vans, 9 ft. wide (wider than anything previously in use on the Caledonian Railway), electrically lighted, for running on "Grampian" trains.

The Forfar-Perth run 32½ miles in 32 min. (start to stop) is still performed by the 10.5 a.m., 5.30 p.m. *ex* Aberdeen. Speed 60·9 miles per hour.

RM JULY 1908



30-TON STEEL COAL WAGON, CALEDONIAN RAILWAY.

for much of the distance between Shap Station and Clifton she was coasting, and so freely as to attain speeds of nearly 70 m.p.h. The first valve of the regulator was used for short spells before and after Penrith, but we were coasting again when the maximum of 75 m.p.h. was attained north of Wreay. Signals checked us in the approach to Carlisle, otherwise we should have run the last 50 miles from Oxenholme in 56½ min.

We drew ahead from the train shortly after arrival to allow the Stranraer engine to pick up the leading van; at the same time the two Carlisle-Edinburgh vans were attached to the rear making a load of 342 tons tare for the next stage of the journey. The gross load was between 355 and 360 tons.

While we stood Edwards took the opportunity to get some coal forward, as the tenders of the "Princess Royal" engines are not fitted with coal pushers. The fire was still in first-class shape, and on getting the right-away No. 6211 settled down to another spell of fine running. The gear was linked up to 15 per cent. by the time we passed Kingmoor sheds; the regulator was wide, but not quite fully opened.

As we swept down towards the Solway with speed rising to just over 70 m.p.h. the first signs of dawn were showing in the eastern sky. It was extremely beautiful, and set off with patches of ghostly white mist lying over the marshlands of the Border.

No change in the controls was necessary for mounting the lengthy stretches of 1 in 200 gradient before Lockerbie; the lowest speed on the first bank was 52½ m.p.h., and on the second 55 m.p.h. This was a striking performance with a train now approaching 400 tons in weight. A permanent way slack was in force at Castlemilk summit, but speed was regained so quickly afterwards that this check did not cost us more than 1½ min. in running. Some very fast work now followed; indeed, at the crossing of the River Annan, north of Wamphray, we reached a momentary maximum of 77½ m.p.h.

Walker was following his usual practice of taking a flying run at the heavy bank, though this time for a few seconds it seemed that we were to be denied this advantage; Beattock distant was showing orange when we first sighted it, but it cleared almost at once, and with the regulator opened again immediately we lost nothing of our fine speed.

Despite the check at Castlemilk we passed Beattock in 42 min. 7 sec. from Carlisle, and with cut-off advanced first to 18, and then to 20 per cent. the ascent of the famous incline was begun in great style. With the dawn, mist was rolling down from the hills. There was every prospect of a gloriously fine day, but a consideration of more immediate concern to us was that the mist had made the rails very slippery. Even before Greskine box was passed No. 6211 had slipped once or twice, and Walker had to handle her carefully on the upper reaches of the bank where the gradient averages 1 in 75 for over 6 miles; the cut-off was kept at 26 per cent., and with this we sustained an average of 24.8 m.p.h. over the last 4½ miles of the climb. In this grey early morning light the rough upland country looked extraordinarily beautiful; looking back from the footplate I saw our smoke trail hanging almost motionless, far behind us in the damp air, and on the down side of the sorting carriages that brilliant chain of lights that renders this train conspicuous above all others.

Despite the hindrance of slippery rails, the 10 miles from Beattock to the summit were climbed in 19¼ min. Any prospects of regaining more of the lost time, however, were dispelled, as a very severe slack for bridge repairs was then in force near Elvanfoot. Even so a brisk finish, under very easy steam, saw us into Carstairs in 90¼ min. from Carlisle. The train was now split into three sections; the Aberdeen portion of five vehicles, known in the Post Office as the Caledonian section, leaves at 4.38 a.m., and at 4.47 a.m. the Edinburgh portion leaves in the opposite direction. The latter consists of the two Carlisle-Edinburgh sorting carriages, and the Birmingham-Edinburgh van which is attached to the "Special" at Crewe. The Edinburgh portion is not gangwayed to the rest of the train. Both Edinburgh and Aberdeen sections are taken forward by Carstairs engines, and on each occasion I have seen it the Edinburgh portion was hauled by an *ex*-Caledonian McIntosh superheater 4-4-0 of the "120" class. No. 6211 was left with the modest load of four carriages to take downhill into Glasgow.

(*To be continued*)

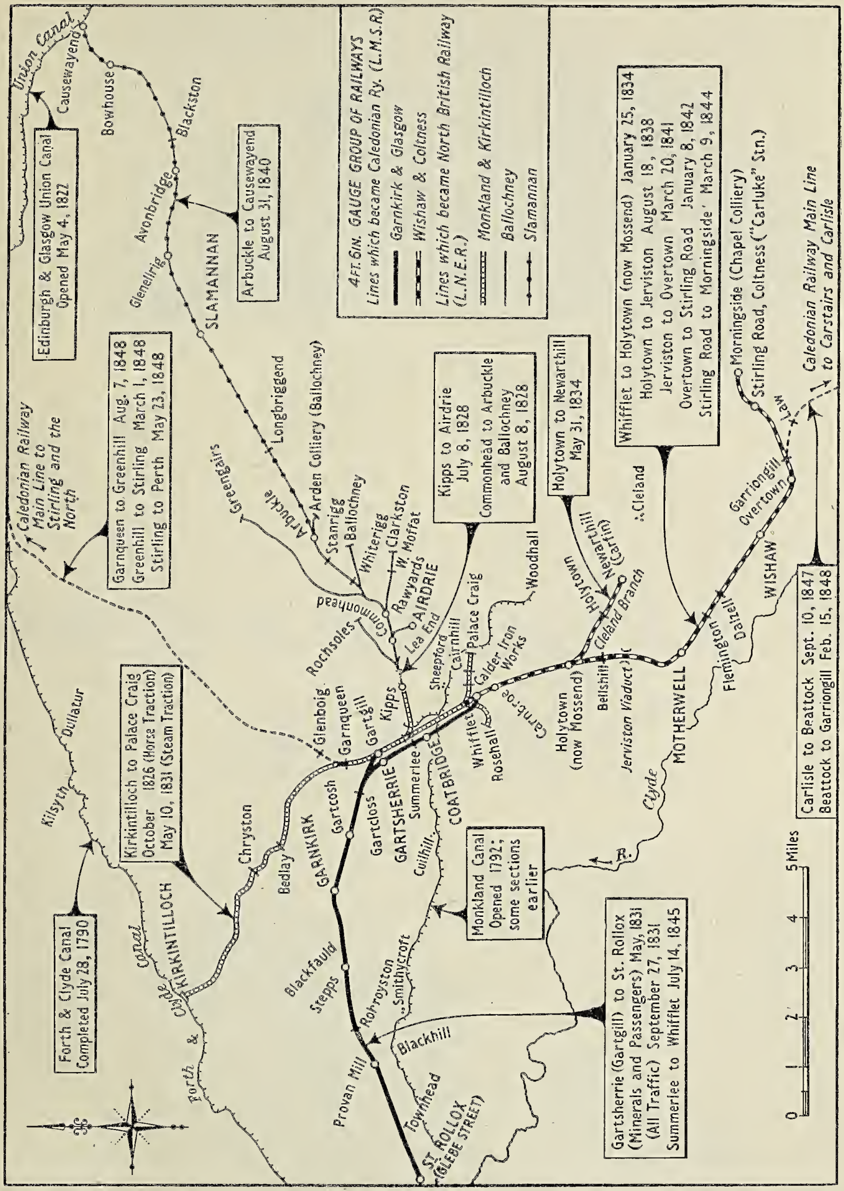
Anglo-Scottish Railway Centenary

By CHARLES E. LEE

THE Caledonian Railway Company was incorporated on July 31, 1845, after a stiff parliamentary fight. In the early formative stages there was a fundamental difference of opinion between rival groups of landowners as to the adoption of the Nith Valley or the Annan Valley route, and the final triumph of the Annan Valley was due very largely to the personal efforts and influence of Mr. J. J. Hope Johnstone, the company's first Chairman. The story is told in detail in the book for private circulation by George Graham (one-time engineer of the Company) which is one of the scarcest items in railway literature. Immediately the Act was obtained, operations were begun at Beattock Summit, but the public ceremony of the cutting of the first sod by Lady Jane Johnstone Douglas, took place in a field near Lockerbie House, on October 11, 1845. The engineers to the company were Joseph Locke and J. E. Errington, and they pushed forward the construction with great vigour. The contract was let to John Stephenson & Company, under the able leadership of Thomas Brassey, one of the foremost contractors in the kingdom, and at one time employing more than 20,000 men on the work. Final inspection of the first section of the line from Carlisle to Beattock (39¾ miles) was made by Captain Simmonds, the Board of Trade Inspecting Officer, on September 4, and the line was opened for public traffic on September 10, 1847.

The further section from Beattock to Carstairs was common to both the Glasgow and the Edinburgh routes, but the two bifurcated at Carstairs Junction. Thence to Edinburgh the line continued as new construction, but in its approach to Glasgow, and also for its main line farther north, the Caledonian Railway made use of a series of early mineral railways that had been developed (originally on the 4 ft. 6 in. gauge) to serve the collieries, etc., east of Glasgow. These lines are shown with dates of opening on the accompanying map. A limited passenger traffic was doubtless carried on these early lines, semi-officially, but the first advertised service appears to have been one between Airdrie (Lea End) and Kirkintilloch, which was begun by the Ballochney Railway Company on July 8, 1828, running a springless horse-drawn coach with accommodation for 30 passengers. The company was called upon to pay Government duty at the rate of 3d. a mile, and Thomas Grahame (one of the Directors) wrote for information on the subject to the Stockton & Darlington Railway; his letter of July 18, 1828, is still preserved. This service was on Ballochney rails only from Lea End to Kipps, and then traversed the Monkland & Kirkintilloch Railway to the Forth & Clyde Canal, where a connection was made with the canal boat service to Glasgow and other points. Actually, this appears to have been the first public traffic of any kind conveyed on the Ballochney Railway, as the line was not opened until August 8, 1828.

The Garnkirk & Glasgow Railway was completed from Gartsherrie to Glasgow (St. Rollox) in May, 1831, and on June 1, a passenger coach to and from Lea End was attached to the trains, providing a through service between Glasgow and Airdrie. A small passenger station was built in 1831 at Gardensquare, Lea End, for this traffic. The coaches were horse drawn between Airdrie and Gartsherrie, and attached at the latter point to steam trains. The Garnkirk & Glasgow Railway timetable of October 1, 1836, shows a Glasgow-Airdrie service of four trains each way daily, of which one was a first-class steam train, two were second-class steam trains, and one a horse coach, but apparently all were horse-hauled east of Gartsherrie. The intermediate stations were Stepps, Garnkirk, Gartcosh, Gartsherrie, and Coatbridge. The Wishaw & Coltness Railway was opened from Whifflet (on the K. & M.) to Holytown, of January 25, 1834, and extended to Newarthill on May 31 of the same year. A passenger coach was operated in the morning from Newarthill, and was attached to the Glasgow train at Gartsherrie; it returned in the afternoon.


4FT. 6IN. GAUGE GROUP OF RAILWAYS
Lines which became Caledonian Ry. (L.M.S.R.)
Garnkirk & Glasgow
Wishaw & Coltness
Lines which became North British Railway (L.N.E.R.)
Monkland & Kirkintilloch
Ballochney
Slamannan
Edinburgh & Glasgow Union Canal Opened May 4, 1822
Arbuckle to Causewayend August 31, 1840
Garnqueen to Greenhill Aug. 7, 1848
Greenhill to Stirling March 1, 1848
Stirling to Perth May 23, 1848
Caledonian Railway Main Line to Stirling and the North
Kipps to Airdrie July 8, 1828
Commonhead to Arbuckle and Ballochney August 8, 1828
Holytown to Newarthill May 31, 1834
Whifflet to Holytown (now Mossend) January 25, 1834
Holytown to Jerviston August 18, 1838
Jerviston to Overtown March 20, 1841
Overtown to Stirling Road January 8, 1842
Stirling Road to Morningside March 9, 1844
Caledonian Railway Main Line to Carstairs and Carlisle
Kirkintilloch to Palace Craig
October 1826 (Horse Traction)
May 10, 1831 (Steam Traction)
Forth & Clyde Canal Completed July 28, 1790
Monkland Canal Opened 1792; some sections earlier
Gartsherrie (Gartgill) to St. Rollox (Minerals and Passengers) May, 1831
(All Traffic) September 27, 1831
Summerlee to Whifflet July 14, 1845
Carlisle to Beattock Sept. 10, 1847
Beattock to Garriongill Feb. 15, 1848
Union Canal
Causewayend
Bowhouse
Blackston
Avonbridge
Glenellrig
SLAMANNAN
Longriggend
Arden Colliery (Ballochney)
Greengairs
Arbuckle
Stanrigg
Ballochney
Whiterigg
Clarkston
W. Moffat
Rawyards
AIRDRIE
Commonhead
Lea End
Rochsoles
Kipps
Glenboig
Garnqueen
Gartgill
Sheepford
Cairnhill
Palace Craig
Calder Iron Works
Woodhall
Whifflet
Rosehall
Carnbroe
Holytown (now Mossend)
Holytown
Newarthill (Carfin)
Cleland Branch
Cleland
Bellshill
Jerviston Viaduct
MOTHERWELL
Flemington
Dalzell
WISHAW
Overtown
Garriongill
Law
Morningside (Chapel Colliery)
Stirling Road, Coltness ("Carluke" Stn.)
Dullatur
Kilsyth
KIRKINTILLOCH
Forth & Clyde Canal
Chryston
Bedlay
GARNKIRK
Gartcosh
Gartcloss
GARTSHERRIE
Summerlee
COATBRIDGE
Cuilhill
Clyde R.
Blackfauld
Stepps
Robroyston
Smithycroft
Blackhill
Provan Mill
Townhead
ST. ROLLOX (GLEBE STREET)
0 1 2 3 4 5 Miles

With the opening of the Slamannan Railway from Arbuckle (on the Ballochney Railway) to Causewayend, on August 31, 1840, a through train twice daily in each direction was begun by that company to St. Rollox, exercising running rights over the Ballochney, the M. & K., and the Garnkirk Railway. A canal connection to Edinburgh was made at Causewayend. The Ballochney toll for these trains was reduced on March 5, 1843, from 3s. 9d. to 2s. 6d. a train.

The construction of other railways upset this structure. The Edinburgh & Glasgow Railway was opened on February 21, 1842, and rapidly took away the combined rail and canal passenger traffic. Later in 1842 the Garnkirk Railway extended its line without parliamentary authority to Coatbridge, on land purchased in

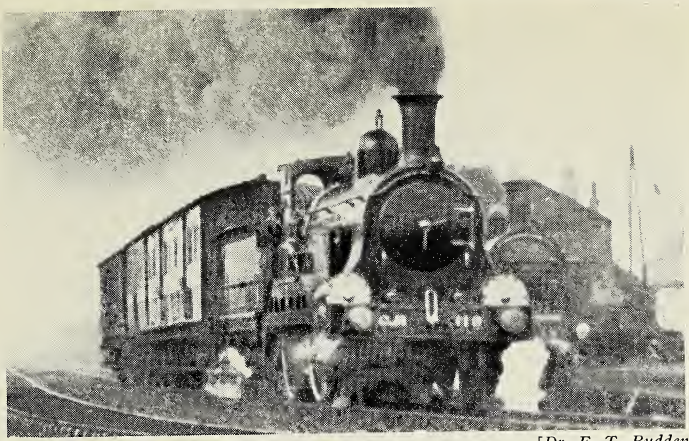
1841, and (despite a Ballochney toll reduction from March 6, 1843) from May, 1843, its train service was run thence, instead of to Coatbridge and Airdrie over the M. & K. and Ballochney. There was an omnibus connection between Coatbridge and Airdrie. The Slamannan trains then ran only between Airdrie (Rawyards) and Causewayend. The Wishaw & Coltness Railway was extended from Holytown (now Mossend) to Wishaw and Overtown on March 20, 1841, and to Stirling Road, Coltness (" Carluke " Station) on January 8, 1842. Passenger services twice daily were arranged, also through to St. Rollox, and there was a road coach connection between Carluke Station and Lanark. The railway was further extended to Morningside on March 9, 1844.

During 1844 the Edinburgh & Glasgow made strenuous efforts to get the M. & K., Ballochney, Slamannan, and Wishaw & Coltness lines under its control, and in the case of the first three it largely succeeded. Those three railways were worked together as one undertaking, under a common management, from March 29, 1845, agreeing to divide their receipts as to the M. & K. 43 parts, Ballochney 46 parts, and the Slamannan 11 parts. A steam train service was inaugurated from Glasgow (Queen Street) to Coatbridge and Airdrie on or about March 1, 1845, using the Edinburgh & Glasgow Railway to Kirkintilloch and a newly-built curve (afterwards called the Garngaber Loop) to the M. & K., which had recently improved its line, and appears to have introduced steam-hauled passenger trains at this time. Through fares to Edinburgh from Airdrie were also quoted *via* Kirkintilloch (now Lenzie). It is not clear how this was worked, as the older lines were still of 4 ft. 6 in. gauge, but the timetable gives no indication of a change of train (or a connection) and possibly the narrow-gauge vehicles ran loose on the standard gauge E. & G. line.

This was the beginning of the fierce conflict of interests between what became the Caledonian and the North British groups. The three Monkland railways entered into an agreement for the Edinburgh & Glasgow to work their lines, and the plant was handed over to that company on December 31, 1845. A bill was promoted in Parliament by both parties in the session of 1846 for complete amalgamation, but was rejected. A change then took place in the directorate of the Edinburgh & Glasgow, and the new directors repudiated the working agreement, on the ground that the provisions and clauses were beyond their powers. Legal proceedings were begun by the Monkland companies, and their working stock was re-delivered to them by order of the Court. From December 1, 1847, the Airdrie to Glasgow (Queen Street) service was abandoned, and a service was instituted between Airdrie and Glasgow (St. Rollox) by the Monkland Railways in connection with the Garnkirk Railway.

The Garnkirk Railway had secured parliamentary authority for its Gartsherrie-Coatbridge section, by Act of 1844, which also granted powers for an extension from Coatbridge (Summerlee) to join the Wishaw & Coltness Railway at Whifflet, and thus avoid running over the M. & K. with its sinuous line that crossed the main road in Coatbridge on the level. This extension from Summerlee to Whifflet was opened on July 14, 1845, and W. & C. trains ceased to use the M. & K. link on their way to St. Rollox. Meanwhile, the Wishaw & Coltness Railway had also come under Edinburgh & Glasgow influence; in October, 1845, the E. & G. had entered into an agreement to purchase the W. & C. The train service from Morningside to Glasgow was diverted over the M. & K. to Queen Street, early in 1846. In December, 1846, the E. & G. cancelled its agreement to buy the W. & C. and the latter arranged to sell to the Caledonian, which immediately leased the line at a guaranteed rent of 10½ per cent. from the beginning of 1847, as the W. & C. was intended to form a vital link in the Caledonian main line to Glasgow.

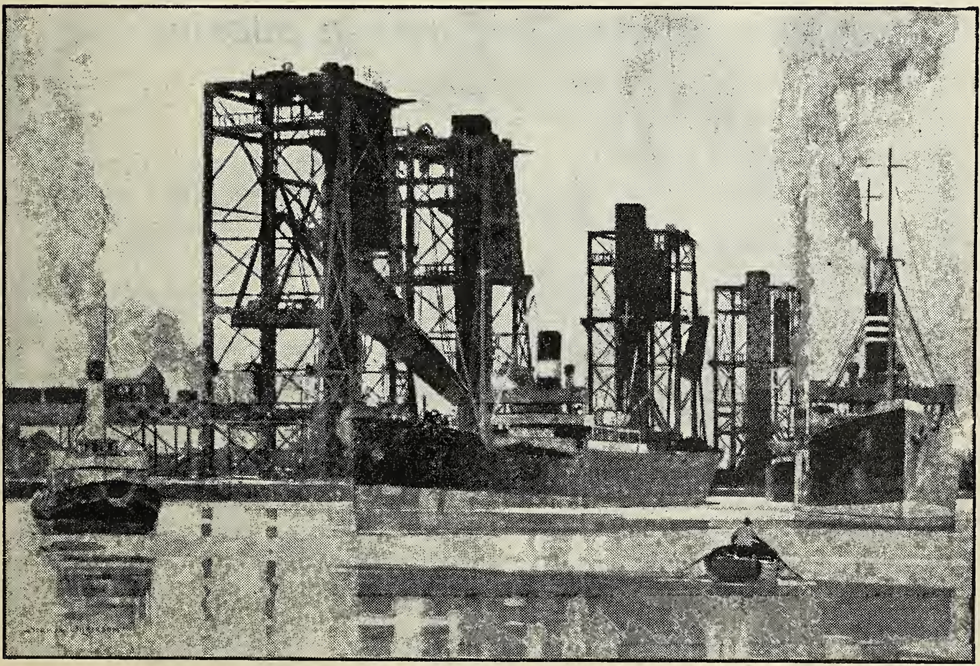
From January 1, 1847, the Wishaw & Coltness Railway again ran in connection with the Garnkirk Railway, instead of the Edinburgh & Glasgow, and its trains were diverted from Queen Street to St. Rollox. Later in the year steps were taken to widen the gauge of both railways to 4 ft. 8½ in., and this was completed well in time for the opening of the Caledonian from Beattock to Garriongill on February 15, 1848, whence the older lines were used to St. Rollox. With the simultaneous opening of the Carstairs-Edinburgh section, the first through railway was completed from London.



Photo] [Dr. F. T. Budden

The Postal train leaving Aberdeen, C.R., in 1891
Rebuilt Connor 7 ft. 2 in. 2-4-0 locomotive, No. 110

GRANGEMOUTH DOCKS



extension to Gourock 3 ¾ m. ckt 1884 3 ~~[illegible]~~

Wemyss Bay Rly from Port Glasgow to Wemyss Bay.

Forfar & Brechin Rly. Brechin to Forfar.

→ Crieff & Comrie Ry to CR in 1898 Crieff to Comrie

Worked & partially owned by CR.

Callander & Oban.

Killin Rly. from C&O to Loch Tay.

Cathcart Ry.

Lanarkshire & Ayrshire Ry. for CR from Whitecraigs to Ardrossan,
Irvine, Kilbirnie etc.

Lanarkshire & Dunbartonshire Ry. from Glasgow to Dumbarton

Brechin & Edzell Rly. Brechin to Edzell.

Kilsyth & Bonnybridge Ry. runs along valley of R. Kelvin & Carron to
Denny branch of CR.

{ Paisley & Barrhead District Ry Paisley - Barrhead - Lyoncross
where joins Lanarkshire & Ayrshire

Glasgow & Paisley R joint with G&SW   Princes Dock Ry joint with NB & G&SW

Glasgow Barrhead & Kilmarnock R joint with G&SW

Dundee & Arbroath (with Carmyllie branch) joint with NB

Portpatrick & Wigtownshire owned by LNW, Mid, Caley, G&SW

Dumbarton & Balloch joint with NB

Glasgow & Renfrew joint with G&SW

CR Act 31 July 1845

Authorised Carlisle - Garriongill (near Motherwell) 84 3/4

branch from Cumbernauld (on Monkland Rly) to Castlecary & Greenhill 10

Clydesdale Junction Act 31 July 1845.

Motherwell - Glasgow, Paisley & Greenock Rly 14 1/2

Opened Carlisle - Beattock 10 Sept 47

" Edinburgh, Glasgow & Castlecary Feb - Aug 1848

Glasgow & Garnkirk amalgamated with CR 1846

Pollock & Govan " " 1846

Greenock section " " 1847

Wishaw & Coltness " " 1849 immediately after opening of main line to Glasgow

Scottish North Eastern an amalgamation in 1856 of the following :-

Arbroath & Forfar — Aberdeen (Aberdeen - Montrose) — Newtyle & Glamis — Newtyle & Coupar Angus — Scottish Midland Junc.

Absorbed by CR in 1866 which at same time acquired Perth & Methven — — Alyth — Dundee & Forfar — Dundee & Arbroath.

owned by Forth & Clyde Navigation

Falkirk (Grahamston) - Grangemouth acquired by CR 1867.

Busby Rly from Kilmarnock Joint Rly near Pollockshaws to Busby & E. Kilbride

Glasgow Central Rly - Rutherglen to Stobcross & Maryhill. Act 1882 ?

Rly Mag.
May 1906

N.T
Complete

On Friday night, April 6th, (1906) the Scotch express, ex Euston, which leaves Carlisle at 8.10 pm., arriving at Glasgow at 10.20pm., ran into a goods train between Kirtlebridge and Ecclefechan. The immediate cause of the accident was the breaking of an axle of the third wagon of the goods train. This wagon turned over, &, derailing three others behind it, scattered them over the down line. Scarcely had the goods train stopped, when the express passenger trai dashed into the wreckage

ALTERATIONS TO AIR MINISTRY ENGINES AT SERVICE UNITS OR SERVICE EXPERIMENTAL STATIONS

When major adjustments and/or alterations to Air Ministry engines are necessary at service units or service experimental stations, instructions will be issued by the Director of Contracts. The responsibility for carrying out the procedure outlined in D. of C's instructions is that of the Inspector-in-charge at the engine station concerned. This Inspector must be in possession of a copy of these instructions, which are obtainable on application to D. of C.

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[Articles and clippings relating to Brit